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The socio-economic consequences of birth order: a study of black and white college graduates.

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THE SOCIO-ECONOMIC CONSEQUENCES OF BIRTH ORDER:
A STUDY OF BLACK AND WHITE COLLEGE GRADUATES

by

Constance Anne Chapman

A Thesis Submitted to the
Graduate Faculty in Partial Fulfillment of
The Requirements for the Degree of
MASTER OF SCIENCE

Major Subject: Sociology

Signatures have been redacted for privacy

Iowa State University
Of Science and Technology
Ames, Iowa

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CHAPTER I. INTRODUCTION

Purpose of the Study

Practically since the advent of modern science, researchers have been interested in the social consequences of birth order. As early as 1874, Galton (1874) commented on the preponderance of first borns among English scientists. Since then there has been continued interest in the subject, although for a period of time between the 1930's and the 1950's the study of birth order was neglected, primarily because the rash of studies undertaken in the 1930's had left such inconclusive and conflicting results. Jones (1931) reviewed over 250 studies which had been conducted since 1881. These studies focused primarily on two aspects of the outcome of ordinal position: physical traits and the incidence of disease. However, Jones was also able to list 88 studies which dealt with birth order and intelligence. Significantly, he concluded that intelligence was not related to birth order. In addition, scholars have studied the relationship between birth order and such outcome variables as prominence, mental illness, delinquency and many more (Chen and Cobb, 1960; Ellis, 1904; Rosenow and Whyte, 1931; Sletto, 1934; Thurstone and Jenkis, 1929).

One of the consequences which has been prominently discussed in the literature in recent years concerns the relationship between birth order and education. As will be seen in Chapter 2, many researchers have commented on the overrepresentation of first borns among college students. There are several unexplored aspects of this finding which are of importance for this paper. First, several of the most recent studies have attempted to show that the overrepresentation is simply a statistical artifact, that it does

not represent the "real" world.

Even assuming that the aforementioned finding is "real", it has remained a fact without reason or significance. Therefore, second, the researchers who have found a disproportionate number of first borns in college have yet to come up with an adequate or unified reason for the finding. Third, it is not yet clear whether there are any advantages accruing to the first born because of this overrepresentation. That is, does quantity of one birth position over another in college translate into quality of living for that over-represented birth position? While it might be slightly disconcerting to know that by accident of birth, one child over another has a better chance of being in college, it is slightly more disconcerting to know that the same accident of birth means that the person will be advantaged before, during and after college. In the former case, there is a social process which stops fairly early in the life cycle. For the latter, this process continues and results in the first born accruing more and more advantages over the later born.

Fourth, even if the first born is advantaged throughout the life cycle it is not known how important these advantages are when other possible sources of advantages are taken into account (i.e., family size, father's occupation, years of education completed, etc.). Finally as will be seen in Chapter 2, almost all of the studies dealing with educational consequences of birth order, primarily as a result of dealing with college populations, have been limited to white, mainly middle-class Americans. This has left a void when discussing the effects of birth order for other groups of Americans.

Therefore, this study will be concerned with 1) attempting to synthe-

size a theoretical framework which not only explains the past findings but which allows further predictions to be made; 2) predicting from that framework to post-college success and testing those predictions while at the same time replicating the previous studies; 3) attempting to cull the significance of birth order differences when possible differences due to other factors are taken into account; 4) attempting to determine if birth order is a predictor of educational and post-educational "success" variables for another group of Americans, i.e., black Americans.

Organization of the Study

In order to accomplish these four objectives, the author will begin by reviewing the previous work which has been done concerning birth order and education. This will have a three-fold purpose. First, it will provide an understanding of the different orientations and resulting definitions of birth order that are prevalent in order to better understand the orientation which will be employed. Second, a review of the literature will give the reader a basis for realizing what educational consequences have been noted for the first borns and which of these consequences have been called into dispute. Finally, it will familiarize the reader with the research which takes race or ethnic origins into account.

In the next chapter a theoretical framework will be formulated which not only accounts for the previous findings but which allows further predictions to be made. The framework will be based on the supposition of differential child-rearing practices for the different birth positions. It will be shown that these child-rearing practices result in different personality and behavior characteristics for the first as opposed to the other

birth positions.

In the fourth chapter several methodological problems will be discussed which could possibly interfere with a clear interpretation of the data. After describing the sample which will be used, an investigation of four hazards to matched samples will be undertaken to see if any of the four will affect the analysis.

The twin problems of representativeness and generalizability of the sample will then be discussed. This will be followed by a discussion of the possible problems stemming from self-selection due to using college graduates.

At this point the reader will have an understanding of the previous work which has been done concerning the relationship of birth order and education, a framework and predictions about education and post-education variables, a description of the sample, and finally, an understanding of the possible methodological problems which could confront the analysis. The analysis will then be undertaken looking first at the means on the dependent variables for the various birth positions. Second, by seeing how much more of the variance has been explained by knowing birth order the reader will have an idea of how important birth order differences are. Last, using path analysis, the effects of the other variables on the dependent variable will be investigated. These three methods of looking at the data will fulfill the last three stated objectives.

This paper will be concluded with a discussion of the findings and a summary.

CHAPTER II. REVIEW OF THE LITERATURE

Definition of Birth Order

Of all the topics in sociology that one might choose to study, birth order, from the standpoint of definitions, seems the least ambiguous. This may be true but it doesn't eliminate the possibility of conceptual misunderstandings. Simply stated, birth order is one's sequential position in the family relative to one's siblings (Warren, 1966, p. 38). All the definitions of birth order are merely variants on this usage. There are two distinct areas of inquiry, however, which give rise to distinct utilizations of the term, not because there is confusion about the meaning of birth order, but because different questions are asked about it. The two questions may be phrased as follows: 1) What are the physiological manifestations, if any, of when, sequentially, a person is born?; and 2) what are the behavioral and personality manifestations of when a person is born? It is these questions which give rise to slightly different uses of the term.

Physiological studies

The basic assumption of the physiological studies is that behavioral disorders are disease entities and that both behavioral traits and disorders are a function of the intrauterine and perinatal influences. This approach has been utilized particularly in those studies where the investigator is concerned with explaining the seemingly higher ability level of first borns. According to Bayer (1967) there are three rival hypotheses which focus on physiological differences and which are trying to explain ability differences. The first assumes a richer uterine environment for the first born. These studies look at the interaction of two variables: birth

order and mother's age. Since it is supposed that the mother has a relatively exhaustive supply of nutritive substances in her body, these nutrients are "used up" by succeeding births. In addition, the mother's age would affect the amount that the fetus could absorb. These kinds of studies, then, would be concerned not with just the first child that lived but also with pregnancies which did not, for whatever the reason, reach term. Therefore, if the first child in the family had been preceded by a miscarriage, he would be considered a second child in these studies. In addition, the researchers would look closely at mother's age, time between pregnancies, etc.

The second hypothesis predicts better conditions for later borns. These studies focus on such variables as use of instruments during delivery, length of labor, birth weight, etc. It is assumed that the first pregnancy is the hardest on the mother and would therefore negatively affect the child. Bayer (1967) also notes that mother's age would be negatively correlated with ability since younger mothers are less likely to follow the correct nutritional program, are less likely to have correct medical care, etc. These studies would focus on pregnancies which reach term, or near enough to simulate a "normal" birth, regardless of whether the child lived.

The last hypothesis, according to Bayer (1967), assumes that both positive and negative factors of the kind mentioned above are operating. From this the researcher would predict a greater variation among the ability levels of first borns; that is, they would expect a greater range of abilities and greater variation. These studies would concentrate on both live birth order and what may be called "uterine stress" birth order. In practicality, though, they seem to use only the live birth order, probably

because this kind of information is easier to obtain and is usually the more reliable of the two types. Bayer (1967) reviews one study which suggests that there is, in fact, greater variation among the first borns. Robert C. Nichols of the National Merit Scholarship Corporation investigated 1,618 high school students who were finalists in the National Merit competition. He also studied a normally distributed sample of 850 high school students. His investigations suggest that there are higher concentrations of first borns in both the very high and very low ability levels (Nichols, 1967).

Although there is variation even within the studies which focus on physiological differences, the interest in physiological variation in birth order requires, to a greater extent than for other kinds of studies, an awareness of all pregnancies, including those which terminated unsuccessfully.

Sociological and psychological studies

The basic difference between the social-psychological studies and the ones that have been discussed is that while the physiological studies are concerned with the physical environment before and during birth, the social-psychological ones are concerned with the sociological environment after birth, primarily family environment. In 1937 Murphy, Murphy and Newcomb summarized over 40 articles concerned with birth order and concluded that there were few clear trends in the data. They considered this a manifestation of the fact that "the objective fact of ordinal position without regard to its meaning to the child, to the siblings, and to the parents, is sure to yield meager psychological results" (Murphy et al., 1937, p. 362). In addition, they pointed out that "his (the child's) psychological position in the family is of utmost importance for the development of social behavior,

but 'psychological position' is by no means completely dependent on birth order" (Murphy et al., 1937, p. 363). It becomes apparent that birth order is important because it produces different experiences, backgrounds and training, rather than because of some set physical difference. In this sense, birth order becomes slightly harder to define because child rearing practices can vary and change, therefore varying the experiences and training. How one looks at the practices will, in part, determine how one defines birth order.

For example, differences in family environment for second children as opposed to first children seem apparent. First born children, for a certain period of their lives, have an exclusive relationship with their parents. This means that the "relevant others" for them are adults. In addition, they are free from competition with siblings. Neither of these things are true for later born children: they have both adult and cohort models and must compete with siblings for their parents' attention.

While this example seems clear cut, on examination it raises many questions. Are all later borns the same in the family environmental sense? To what extent can only children be treated as first borns? For only born children, what is the effect of never having to compete with siblings? Is the last born in any way different from other later born children? The answers to these kinds of questions lie both in theory and research. More importantly, whether the answers to the above questions are relevant depends on the question the researcher is investigating. For example, if someone were studying motivation, and theoretically it seemed as if motivation were unaffected by the presence or absence of later born children, then first born and only children could be treated the same. In other cases, this grouping

may be unwise. While all the variations lie within the simple definition given in the beginning of the discussion, the ultimate use of the term depends on what Sampson calls "a particular kind of sociological environment and a set of psychological experiences that are assumed to lead to the development of patterns of personality and behavior" (Sampson, 1965, p. 180). As such, one must know what parts of the environment and what experiences are relevant to the study under consideration in order to know whether the term and categories used are legitimate. An understanding of the experiences that have been posited and the patterns of behavior that have been observed and found to obtain will help to facilitate this process.

Consequences of Birth Order

The relationship between birth order and education is perhaps the best documented of the consequences that we are concerned about. Therefore, this will be considered first. Then the related areas of intelligence and achievement will be appraised and finally, the areas of income and occupation will be reviewed.

Educational attainment

The relationship between birth order and education was first noticed after Schachter (1959) published his book on affiliation. Other researchers noticed something that seemingly had skipped Schachter's attention; there was an overrepresentation of first borns among his sample. This serendipitous findings started several researchers, Schachter among them, investigating the relationship between birth order and education.

Incidence of college attendance Schachter (1963) noticed a number of studies that posited a relationship between being first born and being

eminent. Perhaps because of his earlier finding, he investigated the possibility that this was a spurious relationship that indicated nothing more than greater education among first borns. He says that "it is conceivable that first borns are simply more bookish or that their educational opportunities are greater". If true, the consistent overrepresentation of first born among eminent scholars may reflect nothing more than an overrepresentation of first borns among all scholars -- eminent or not" (Schachter, 1963, p. 759).

Since scholars, particularly in more recent times, are virtually certain to have gone to college and perhaps graduate school, he decided to look at the proportion of first borns in college and graduate schools. He summarized data on students from the University of Minnesota, from a national sample of college students, on a large sample of medical school students, and on students at Columbia College.

Schachter (1963) studied two samples from the University of Minnesota. First, in 1959 and again in 1961, he collected data on the undergraduate students in the introductory psychology course at the University. The population contained both males and females who had obtained an average age of 19 years. He found that for every family size there was an overrepresentation of first borns; the first borns, including only children, comprised 50.3% of the sample of 4,013 students. Without only children the percentage was 40.1.

The second sample consisted of all the graduate students registered in the Department of Psychology and the Institute of Child Welfare at the University of Minnesota in 1961. While there were only 199 students in this sample, it seems that the birth order effects is more predominant for

graduate school than for the undergraduate school: 57.8% of the sample were either only children or first borns. The overrepresentation seems to stem, in this instance, from the only children: they constituted 20.6% of the graduate students.

In addition, Schachter reported three studies done by other scholars. In 1961, NORC collected information on 3,397 college seniors (Osgood, 1962). In 1958, the same organization had collected data on 2,842 graduate students in all fields in 25 universities (Davis, 1962). The first and only children comprised 49.6% of the undergraduate sample and 52.9% of the graduate sample. Without only children, the proportions were respectively 35.5% and 35.3%. Once again, the overrepresentation seems to stem predominantly from the only children.

The same pattern held constant for a group of 2,669 medical students who comprised 91% of the student body of eight randomly selected medical schools in the United States (Coker et al., 1959). Some 49.6% of this group were first born; of this, 10.4% were only children.

However, before Schachter (1963) accepted the finding that first borns are overrepresented in college, he checked two areas which could account for the data. First, he looked at the proportion of first borns in a Minnesota high school since he assumed that no selection had taken place at this time. He found that first borns comprised only 35.2% of the 651 students; of these, only children accounted for 8.0%. Therefore, he concluded that whatever the factor that was operating, it did not take effect before college.

Secondly, he looked at the birth rates for the various birth positions for the years when he estimated the subjects in his samples would have been born. This was to determine if the overrepresentation was simply a reflec-

tion of an overrepresentation of first borns being born in that year. Except for the high school sample, he found no such occurrence. For example, he estimated the high school students to have been born between 1943-47. The average percent of first borns born during those years was 34.06%. The first borns comprised 35.2% of the high school. However, for the undergraduate population, there was an excess of 12 percentage points of the first borns in college over the first borns born in the estimated year of birth. For the University of Minnesota graduate students this figure jumped to 21 percentage points. Schachter concludes with the following:

Whatever the explanation, the drift of the data is clear. The repeated finding of a surplus of first-borns among eminent scholars appears to have nothing to do with any direct relationship of birth order to eminence but is simply a reflection of the fact that scholars, eminent or not, derive from a college population in which first-borns are in marked surplus (Schachter, 1963, p. 768).

Since 1963, Schachter's findings have been replicated by several researchers. Between 1960 and 1963, Altus (1965a) collected data on all incoming students from one-, two-, three- and four-child families at the University of California at Santa Barbara. He found that the percentages of first borns from the two-, three-, and four-child families were respectively 63.0, 50.5, 50.5%. Of all the 4,258 students from whom he collected data during those four years, 62.8% were first born (Altus, 1965a). Excluding only children this figure is 48.7%. As can be seen from Table 1, these figures are higher than the percentages found by Schachter (1963). Although the relationship between birth order and intelligence will be discussed more fully in a later section, Altus (1966) suggests that the birth order effect is more predominant the more selective the university.

For example, he notes that the students at the University of California,

Table 1. Birth order of college students or adults who have attended college as reported in the literature

Study	Only Children %	First Borns %	Only plus First Borns %	Other Borns %	Number in Sample	Year of Study
Minn. High School ^a	8.0	27.2	35.2	64.8	651	1961
U. of Minn. undergrads. ^b	10.2	40.1	50.3	49.7	4013	
U. of Minn. grads. ^a	20.6	37.2	57.8	42.2	199	1961
NORC undergrads. ^b	14.1	35.5	49.6	50.4	3397	1961
NORC grads. ^c	17.6	35.3	52.9	47.1	2842	1958
Medical students ^d	10.4	39.2	49.6	50.4	2669	1957-58
U. of California, Santa Barbara, undergrads. ^e	14.2	48.7	62.8	37.2	4258	1960-63
National Merit finalists ^f	**g	59.0	--	41.0	1311	1964

^aSource: Schachter (1963).

^bSource: Osgood (1963).

^cSource: Davis (1962).

^dSource: Coker et al. (1959).

^eSource: Altus (1965a).

^fSource: Nichols (1966).

^gNo only children included in study.

Table 1. (Continued)

Study	Only Children %	First Borns %	Only plus First Borns %	Other Borns %	Number in Sample	Year of Study
Guidance study adults ^h						
13-15 yrs. of school	11.5	32.8	44.3	55.7	122	1928
16 yrs. of school	8.7	40.9	49.7	50.3	149	1928
17 + yrs. of school	10.3	46.2	56.4	43.6	78	1928
Dartmouth College ⁱ	10.8	42.3	53.1	46.9	192	1928
Mt. Holyoke ^j	11.0	50.8	61.8	38.2	76	1938
Queens College ^k	6.8	39.9	46.7	53.3	300	1940
Project talent ^l	12.3	46.2	58.5	41.5	400,900	1960-61
Young marrieds ^m	9.7	30.6	40.3	59.7	692	1963-64
Ph.D. recipients ⁿ	18.6	35.6	54.2	45.8	3009	1962

^hSource: Smelser and Stewart (1968).

ⁱSource: Bender (1928).

^jSource: Hayes (1938).

^kSource: Abernethy (1940).

^lSource: Bayer (1966).

^mSource: Adams and Meidam (1968).

ⁿSource: Bayer (1967).

Table 1. (Continued)

Study	Only Children %	First Borns %	Only plus First Borns %	Other Borns %	Number in Sample	Year of Study
Westmont College ^o	7.0	51.0	58.0	42.0	142	1967
Westinghouse talent search ^p	13.8	34.7	48.5	51.5	536	1967
Starred scientists ^q	8.0	33.5	41.5	58.5	906	1946
Gifted children ^r	15.3	32.3	47.6	52.4	574	1925
Yale University ^s	* ^t		61.0	39.0	100	1962

^oSource: Walker and Tahmisian (1967).

^pSource: Datta (1968).

^qSource: Cattell and Brimhall (1921, p. 803).

^rSource: Terman (1925, p. 122).

^sSource: Capra and Dittes (1962).

^tBreakdown by only and first born not available.

Santa Barbara are selected from the top 10 to 15 percent of all applicants with respect to high school grades (Altus, 1966).

As additional support for this thesis, Altus (1966) reviewed data collected by Robert Nichols of the National Merit Scholarship Corporation. The 1,311 students were Merit finalists and were estimated to be in the top 0.5% of the general population with respect to aptitude. Fifty-nine percent of this select group were first borns. This only included children from two-, three-, and four-child families. This figure of 59.0%, then, does not even include only children. One could expect it to be higher if this sample follows the pattern set by others (Nichols, 1964).

Both the data recorded by Altus (1965a) and data recorded by Schachter (1963) at Columbia College allow comparisons over time. Altus collected his data for a four-year period between 1960 and 1963. During the four years, the percentage of only children entering the University of California varied a mere four percentage points; from a high of 16.6% in 1961 to a low of 12.1% in 1963. The other birth positions show the same constancy (Altus, 1965a).

Schachter (1963) collected data on a 10% sample of all undergraduates from two-child families who entered Columbia College between 1943 and 1962. During that period, the percent of first borns ranged from 52.5% between 1951-54 and a high of 66% in the period between 1955-58 (Schachter, 1963). However, if one considers the years of birth of the babies born during those periods, the 10 percentage points becomes more understandable. The first period children were probably born in the heights of the depression, while the second group was born after the worst was over. The fact remains that the overrepresentation during the 20-year period continued with small

fluctuations.

The time aspect of the overrepresentation of first borns in college is also given credence by a study in 1928 of Dartmouth college students. Although the author was studying other than birth order effects, a reworking of the data shows that Bender's sample of 192 sophomores contained 53% first borns and only children (Bender, 1928). The same trend was found to hold at Mt. Holyoke College in 1938 when Hayes found 62% of the sample to contain first borns (Hayes, 1938). Comparable results have also appeared at Yale University (61% first borns in 1962) (Capra and Dittes, 1962, p. 302), Westmont College (58% in 1967) (Walker and Tahmisian, 1967), Queens College, N.C. (47% in 1940) (Abernethy, 1940), and Reed College (66% in 1964) (Altus, 1966). Other studies cited by Bradley (1968) which have reported an overrepresentation but for which the exact figures are not available include Kansas State University (Danskin, 1964), University of Florida (Hall and Barger, 1964), and University of Nebraska (Warren, 1966).

Probability of college attendance The only inconsistent findings obtained when the researcher asks a slightly different question. Until this time, all the studies have focused on the proportion of first borns attending college. However, Bayer (1966) focused on not just who is in college but who goes to college. Instead of asking if the probability of finding first borns in college is greater than the probability of finding other borns, he asked which of the sibling positions has a better chance of attending college. He studied high school seniors who were part of the "Project Talent" study of American youth. He followed up a year later with another questionnaire. From the information for the two years, he was able to calculate who had gone to college. He found that 55% of the first borns

had gone on to college. In addition, as can be seen in Table 1, of those in college, 58.5% are first borns. While this would seem to support the other studies, he further controlled for family size and socio-economic status and, in so doing, divided his sample into three categories: first born, intermediate child, and last born. At this point his study diverges from the others, since the others did not consider the last born as a separate category. He found that first borns have about an equal chance of attending college as do last born children with the intermediate child lagging behind. He found, as one might expect, that the percent in college increased with increasing socio-economic status. Within each of the three birth order categories, there was a 50% difference between high and low SES. The only child was the most likely of all to attend college, regardless of SES.

Bayer (1966, p. 484) concludes that the previous findings reported in the literature may have indicated a spurious relationship, "an artifact of the method of analysis." While Bayer has certainly added knowledge where none existed before, his analysis does not negate the previous findings. The other research has reported nothing on last children for a simple reason; they did not study last, as opposed to first, children. This does not mean that the findings that Schachter, Altus and others have reported are wrong. It simply suggests that they need to reexamine their data in the light of Bayer's findings.

Relationships within family groups Two years later, two studies appeared which made further innovations into the study of birth order and education. Adams and Meidam (1968) studied a randomly selected sample of young, white, married adults in Greensboro, N.C. and the subjects' nearest-age siblings. The inclusion of information on siblings is what makes their

study different from the others. In addition, their sample included both those who had completed high school or more and those who had not completed high school. They found that when they controlled for sex, SES and sibship size, birth order was not a predictor of who attended college.

Even when the data is reanalyzed in the same way as Schachter and the others (see Table 1), only 40.3% of those who had attended college were first borns or only children. While this figure might be slightly above what one would expect, it is certainly less impressive than the previous results. However, because Adams and Meidam (1968) had information only on the nearest-age sibling, they had complete information on some families (one- and two-child families) and incomplete information on others. While it is not clear that this would account for their findings (or lack of them), it does raise questions as to the effects of studying both complete and incomplete family units without controlling for completeness of the information.

Smelser and Stewart (1968) did take this into account when they studied participants of the Guidance Study. They collected information on both the families of the participants and information on the families of the subjects' spouses. They ended up with 277 family units to study. The authors first presented the data in the format of previous studies which they point out "does not attend to the fact that the subjects in different birth order positions come from different families and from different types of family constellations" (Smelser and Stewart, 1968, p. 296). A look at Table 1 shows that first borns were overrepresented in the college populations. Furthermore, the proportion of first borns increased with increasing years of education.

Smelser and Stewart then looked at only the two-child families. They controlled for both birth order and sex of siblings. They found that in all female or all male two-child family, there was no advantage of first born over later born. In a mixed sex (MF or FM) two-child family, the first born did obtain an advantage over the second to attend college, graduate and then attend graduate school. More importantly, this mixed sex family constellation was overrepresented in their sample; 57% of the two-child families were cross-sex while 43% were same sex families. They noted that this finding was supported by data from two independent studies (Jones, 1939; Bayley, 1966). Unfortunately, the sample size did not allow analysis of three- or four-child families in the same manner.

Perhaps part of the overrepresentation that has been found in other studies stems from this cross-sex constellation. Westoff et al. (1963) report that parents who have children of the same sex desire to have more children while parents of cross-sex children are more likely to limit their families. Furthermore, if the cross-sex pattern of college attendance persists for larger family sizes, then it would seem that the parents' desire for a mixed sex family would be confounded with the overrepresentation of first borns. In other words, by desiring mixed sex families, parents would be favoring first borns over other children. However, it must be noted that in the light of the evidence presented in Smelser and Stewart's paper, this suggestion is only preliminary and needs to be investigated further.

Summary In order to summarize the findings so far, one must keep in mind the three different research questions asked. The first studies dealt with the question of who was in college. The overwhelming results showed that first borns, including only children, were represented in far

greater proportions than would be expected by either chance or by proportion of first borns born during a given year. In addition the relationship seemed to hold regardless of family size and SES of the family of origin. The overrepresentation seemed to increase with increasing years of education and perhaps with the selectivity of the school.

Secondly, it was asked whether each birth position had an equal chance of going to college, not just of being there. For this question, there were conflicting answers. (Bayer (1966) found the first and last child to have a better chance of attending college than the intermediate child. In addition, he found that SES had a great effect, with the higher SES child having a greater chance of attending than the lower SES child. Adams and Meidam (1968), however, found no relationship between birth order and college attendance. Even when their data was reanalyzed for inclusion into Table 1, the proportion of first borns was lower than found in any other sample. Without trying to explain away the conflicting data, it must be pointed out that the sample included partial information on some family units and complete information on others. With each succeeding family size, the probability of excluding first borns from the sample increases. Secondly, Adams and Meidam (1968) included so many controls in their analysis that they were left with extremely small numbers on which they based their percentages. This, of course, introduces the possibility of greater error.

The last question which was asked concerned the siblings. Smelser and Stewart (1968) were concerned with which birth positions within the family unit had the greatest chance of attending and completing college. They found the first borns to be favored only in cross-sex families, and they found cross-sex families to be overrepresented in the population.

Therefore, except for the one conflicting study, first borns, in various ways, seem to have an advantage over others in the family. In order to clarify these findings, a look at the other correlates of birth order would be helpful.

Intelligence and achievement

One of the first studies to note the relationship between birth order and intelligence was undertaken by Terman (1925) some 40 years ago. He investigated the characteristics of 1,000 "gifted" children. In order to be classified as gifted, a child had to score 140 or higher in the Binet IQ scale; this corresponds to the top 1% of the general population. It should be noted that Terman employed a physiological definition of birth order in assigning ordinal position to the child. That is, all pregnancies, whether successful or not were considered as a birth position. Even utilizing this definition, he found that his sample contained 48% first born children. This percentage was based on only about half the cases, the others being eliminated because of incomplete medical histories of the mother.

Terman's finding is a harbinger of Nichols' (1964) and Altus' (1966) work done in the early 1960's. Besides showing that birth order was linked to aptitude for the Merit finalists, Nichols' work indicates that test scores are not related to birth order for the general population of students. In the very large number of students who took the test before the eliminations, there appears to be no relation between birth order and scores.

In addition to noting the overrepresentation of first borns in his sample of undergraduates at the University of California at Santa Barbara, Altus (1965b) also examined the test scores from the Scholastic Aptitude

Test required of all incoming students to Santa Barbara. The SAT consists of two parts, the Verbal Aptitude Test (VAT) and the Mathematics Aptitude Test (MAT). These tests are reported in standard scores with a mean of 500 and a sigma of 100. Altus eliminated the only child from the analysis of test scores because it was felt that the only child was somewhat deviant in unknown ways. Altus found no difference between first and later students on the MAT. Although the female first born students were slightly higher than their later counterparts, the difference was not significant. However, for both males and females there was a difference between first born and later born on the verbal scores although the t-test was significant only for females. The first born females scored 18.75 points higher than later born females; the difference for men was 12.0. Altus concludes that the first borns' scores were as predicted in three out of four cases but that the difference was significant only once. A replication of this study by Walker and Tahmisian (1967) at Westmont College in Santa Barbara also showed that first borns are more verbally able than later borns.

High school students Patricia Lunneborg (1968) also attempted to replicate Altus' work with a high school sample of 2,878 males and 2,523 females. She chose the high school sample in order to see the effects of birth order on a more nearly normal population. Not only did she look at the SAT scores but also high school grades. While she found no overrepresentation of first borns in the sample (37% including only children), she did find that:

First borns were not merely superior verbally, as were college freshmen; they excelled over a range of specialized abilities, many quantitative ... Further, the practice of analyzing only children separately from first borns found empirical support and reinforced the notion that only children cannot be treated in

these studies simply as first borns without sibs. In both sexes, while first borns were superior to only children, there was no tendency for only children to be superior to later borns (Lunneborg, 1968, p. 101).

There are several other studies which have explored the relationship between birth order and achievement or intelligence among high school populations. Schachter (1963, p. 767) compared the grade point averages for the 651 students from the Minneapolis high school and found that the first borns had higher grade points than later borns. Based on a four-point scale, the first borns had an average of 2.25 and the later borns had an average of 2.05. In addition, his data seems to suggest that grade point is also related to family size with the students from smaller families receiving the higher grade points. Schachter attributed this finding for first borns to higher motivation or achievement rather than intelligence.

Oberlander and Jenkin (1967) studied 972 children in grades 5, 7, 8, and 11. They obtained measures of IQ, achievement (either the California Achievement Test or the SRA HS Placement Test), and grade point average. They found higher scores on all three measures among first born than later born students. However, they note that:

In light of the fact that the achievement measures correlate highly with the IQ scores, and in light of the non-significant results obtained from the analysis of covariance (for IQ), we must conclude that whatever differences were found between birth order groups are mainly due to differences in skills which IQ tests measure (Oberlander and Jenkin, 1967 p. 108).

The differences for achievement scores and grade point averages obtained, however, regardless of socio-economic level or sex. Eleanor Singer (1966) also found that among high school students, regardless of sex or class, first borns manifested superior scholastic ability. She says that the differences are not attributable to differences in IQ but rather reflect

differences in achievement training among boys and conformity to adult standards among girls. In addition, Lois-Ellen Datta (1968) while not attempting to measure achievement as such, found an overrepresentation of first borns in a sample of high school students chosen for their above average achievement.

Grade school students Two studies have investigated the same relationships among grade school children and found that the patterns persist. Both of the studies contrasted the "performance of first borns ... directly against that of their own siblings" (Chittenden et al., 1968, p. 1224). Chittenden et al. (1968) contrasted the achievement records of 129 pairs of first and second born siblings and found that the first born were favored over the later born. In addition, they found indications that the advantages for the first born may be stronger for siblings close in age and for first born females. Kenneth Wolf (1967) found that in three children families the same relationship between birth order and achievement persisted. He also found evidence to support the cross-sex hypothesis of Smelser and Stewart (1968); he found that first borns scored higher in those cases when they were followed by a sibling of the opposite sex. He found no relationship between birth order and IQ scores.

Summary There seems little doubt from these studies that first born children, regardless of age or class differences, are better achievers than later born children. Whether this is attributable to differences in intelligence is highly problematic. Harold Jones (1931) reviewed over 88 studies dealing with birth order and intelligence. He concluded that the statistically significant findings which had been reported were largely a consequence of methodological shortcomings in the research. He particularly

noted the failure to standardize scores by age. Among the research reviewed here which noted birth order differences in IQ (Oberlander and Jenkin, 1967; Singer, 1966) the authors were particularly reluctant to place significance on those findings, preferring to attribute the differences to factors other than intelligence. Clausen (1968, p. 20) summarizes the feelings of most authors on the subject of birth order and intelligence. He says:

The superior school performance of the first-born is not evidence of intelligence superior to that of their siblings, however. It appears rather to be a resultant of greater striving to achieve within the school setting, which, in turn, seems to derive both from the influence of parental aspirations and pressures and from a number of personality attributes which slightly incline the first-born toward greater acceptance of conventional or adult-approved activities -- traits that lead to the labels adult-oriented, conscientious, studious, serious, and so on (McArthur, 1956).

The reasons for the greater achievement of first borns is far from clear, however, particularly when one remembers the findings of Nichols (1964), Altus (1965b) and Terman (1925) that indicate a strengthening of the relationship among the very bright segment of the population. In particular, Altus (1965b) suggests that the greater the selectivity of the college, the greater the proportion of first borns one would expect to find. Table 2 contains all available reported findings from various colleges and universities. The schools have been ranked according to a selectivity factor devised by Astin (1965). He defines this factor, called Estimated Selectivity (SEL) as "the total number of highly able students who want to enroll at the college divided by the number of freshmen admitted" (Astin, 1965, p. 55). A highly able student was, in turn, defined by his score on the National Merit Scholarship Test. The higher the score on SEL, the more selective the university. As can be seen, the greater the selectivity of the school, the

Table 2. Birth order effects for various colleges ranked on selectivity

College	(1) First Born Children % ^a	(2) Only Born Children %	(3) Estimated Selectivity	(4) Number in Sample	(5) Year of Study
Queens College, N.C.	46.7	6.8	54	300	1940
University of Minnesota	50.3	10.2	58	4013	1961
Westmont College	58.0	7.0	58	142	1967
University of California	62.8	14.2	58	4258	1960-63
Dartmouth University	53.1	10.8	69	192	1928
Mt. Holyoke	61.8	11.0	69	76	1938
Yale University	61.0	* ^b	72	100	1962
Reed College	63.0	* ^b	74	*	1964

^aIncludes only children.

^bIndicates that information was not available.

higher the percentage of first borns in the sample. This finding seems to support Altus' contention. More importantly it indicates that something more than motivation is needed to account for the achievement of first borns. This something else may be found by looking at the personality factors of first borns as compared with later borns. However, before doing that, it will be seen whether the first born's orientation towards achievement in academic life carries over into other areas of his life.

Occupation and income

Although most researchers have concerned themselves with the effects of birth order on educational variables, a few have studied other status related variables. Murphy et al. (1937) reviewed a work of British genius done by Ellis (1904). [In this study, Ellis suggested that, in all but large families, it is the eldest child who achieves fame. In large families, he found that the youngest was more likely to have achieved fame.] In addition, Lees (1952) in a study of British miners, and Yasuda (1964) in a study of Japanese males, noticed a relationship between the amount of mobility and birth order. Lees (1952) found that 40% of the miners who had been awarded scholarships for adult education were first born. Since his sample contained not only children, this represented in all probability an overproportion of first borns. Yasuda (1964) who studied the eldest sons (not necessarily the first born) found that the eldest was found more often in the higher prestige occupations such as professional and managerial positions while the other born sons were more often manual workers and the like. In addition, the eldest sons seemed to inherit their father's occupations more often, particularly in the higher status occupations.

The most recent and comprehensive study of birth order and occupations was undertaken by Blau and Duncan (1967). They analyzed the American occupational structure utilizing data collected in cooperation with the U.S. Bureau of Census and ended up with a sample that contained over 20,000 persons. In general, their results corroborate the consequences concerning education while broadening the scope of the advantages accrued by the first born. [They found that the occupational attainments of the oldest and youngest children were superior to that of the middle child.] In addition, they say that "the chief advantage enjoyed by men born either first or last, as well as by only children, is their better education" (Blau and Duncan, 1967, p. 307).

Furthermore, they investigated more fully the relationship between birth order and family size. Blau and Duncan (1967) [found that youngest sons are somewhat more successful than oldest sons in large families.] In small families, there is no such effect. They conclude that family size and sibling position have direct effects on occupational attainment as well as interacting in their effects. Concerning family size they say:

The proverbial large happy family is not conducive to occupational success. The task of raising many children evidently strains parental resources, with the result that the advantages of a higher education go predominantly to men with few siblings. Men from small families are more likely than men from large ones to continue their education on every level up to college graduation. However, college graduates from large families, many of whom had to overcome more serious obstacles than those most small-family boys had to face, are more likely to go on to graduate work (Blau and Duncan, 1967, p. 328).

In attempting to explain their findings, they consider the tradition of primogeniture to be not entirely forgotten. They think that perhaps the parents are often particularly eager for the oldest son to succeed. In addi-

tion, [they mention that first born children are more likely to accept the values of the community, a finding which means that the oldest would put more emphasis on achievement.] However, like the other studies reviewed, the authors are more confident in their findings than in the reasons for the findings. In summary, they say that:

... family size not only affects future chances of success by determining the resources available for the education of each child, but it also interacts with other conditions in the family to influence educational attainment and, thereby, occupational success. The careers of all men benefit from having few siblings, but those of oldest sons benefit more than those of younger ones. Older sons in large families appear to make sacrifices and assume responsibilities for younger ones. The resulting benefits that accrue to younger sons in large families compensate in part for the more limited resources available for any child if there are many. Hence, younger sons are least disadvantaged by having many siblings. The educational benefits a small family is capable of providing, however, do not tend to be realized unless its climate is favorable to education, since a positive orientation to education is what induces parents and children to implement educational ambitions by drawing on potential resources, including the greater resources available in small families (Blau and Duncan, 1967, pp. 329-330).

One serious shortcoming with most of the studies reviewed so far is that each sample has been limited as to its racial or ethnic composition. That is, almost without exception, the studies have been undertaken on a white population. Whether the findings were obtained regardless of race or ethnic group affiliation is not at all clear. While few authors have concerned themselves with this question, those who have deserve attention.

Cross-cultural Studies of Birth Order

The reason that one would concern oneself at all with birth order differences among non-white populations stems from the same basis that makes one suspect differences in the first place. Those authors concerned with the psychological and sociological definition of birth order assumed a

sociological environment and psychological experiences to account for any differences. However, one cannot assume the same environment and experiences for all regardless of class or ethnic origin. Socialization practices may account for differences due to socio-economic background, for example. However, if there are no behavioral differences between lower and upper class children, for instance, then one would not want to look for socialization differences. In other words, knowledge about whether differences exist or not is a logical first step.

Perhaps because the researchers have been concerned with such timely subjects as discrimination and prejudice, very little work has been done on birth order within ethnic or racial groups. Greene and Clark (1968) studied the proportion of first borns at New Mexico Highlands University and included in their sample both Anglo-Americans and Spanish Americans. They found that the Anglo-Americans were significantly overrepresented when compared with census data on live birth order while there was an underrepresentation in the Spanish-American group. However, after adjusting for family size and social class, they found an overrepresentation of first borns in all social classes in both ethnic groups.

In the same year, a study appeared by Diab and Prothro (1968) of Arab undergraduates at the American University of Beirut, in which they found no overrepresentation of students, regardless of family size. Even controlling for whether the student was an "honor" or a "regular" student, no overrepresentation appeared. Diab and Prothro (1968, p. 1141) conclude:

... the results of the present study do not lend support to previous evidence by Altus (1965a showing that 'within families of the same size the firstborn has the cards stacked in his favor' in being overrepresented in college.

As we will discuss momentarily, one of the greatest shortcomings in the area of birth order studies is a lack of theoretical material with which to explain the findings. Diab and Prothro, in failing to discuss the possible reasons for their findings, such as different child rearing practices and family structure, have also abrogated their responsibility for understanding the American findings.

Cramer, Bowerman and Campbell (1966) studied the educational plans of Negro and white youths from the South. They were primarily interested in the Negro youths but included the whites for comparison. The youths were in grades 9 through 12 and were questioned as to their anticipated plans concerning education. ~~As did Blau and Duncan (1967),~~ Cramer et al. (1966) concerned themselves with both birth order and family size. Contrary to what has been seen all along they found that "birth order (is) not a very exciting predictor of educational plans in either race, but it seems to have relatively greater utility for whites" (Cramer et al., 1966, p. 105). Nevertheless, they did find that family size did affect educational plans in the ways that have already been noticed. That is, large families seem to have an adverse effect on educational plans. However, the advantages of small families were greater for whites than for Negroes. That is, children from small families were more likely to be planning on going on to college, but this trend was stronger for whites from small families than blacks. Interesting enough, they found that large families adversely affect educational plans equally for whites and blacks; they found that "while whites are usually quite a bit more likely to be planning to go to college, those from large families have no higher expectation level than their Negro counterparts" (Cramer et al., 1966, p. 101). In addition, they found that con-

trolling for scholastic aptitude, academic commitment, or grades did not alter the relationship between family size and educational plans.

What effects birth order had were mainly restricted to the white children. Among small white families, the oldest child was most likely to be planning on going to college. This is what one might expect from previous findings. However, they did notice that the advantage for the oldest child among whites increases with the size of family. All differences between birth orders for Negroes were so small as to be attributable to sampling fluctuations.

Cramer, et al. (1966) conclude that as predictors of educational plans, family size is much more important than birth order and is more important for whites than for blacks. Concerning other background variables they summarize:

We have seen that socioeconomic status is positively related to the expected level of educational attainment. We have also found high academic ambitions to be relatively often associated with urban residence, intactness of families, and with being a member of a small family (with few, if any, siblings). These suggest that financial security, large shares of individualized attention from both parents, and similarity to the middle-class model of 'proper' life style and values ... are key factors most directly contributing to prospects for a future that includes college education (Cramer et al., 1966, p. 106).

While one could make a case for the inadvisability of leaping from educational plans into educational, occupational, and scholastic achievement, Cramer, Bowerman and Campbell (1966) have made a very important contribution by pointing out that differences may exist in the way phenomena work as predictors for people within different "cultural" groupings. They mention that:

... what we are observing, then, is that key variables for predicting plans have less effect on the plans of Negroes than on those of whites ... Especially interesting is the finding that it is among the most advantaged students that the racial gap in

ambitions seems to be the widest (Cramer et al., 1966, pp. 106-107).

Summary

In this chapter the literature has been reviewed concerning the various definitions of birth order, the consequences of birth order, and the studies of birth order which have been conducted cross-culturally. It has been seen that the definition of birth order depends mainly on whether the researchers are undertaking a physiological based study or a social and/or psychological based study. The former usually takes into account all pregnancies, whether they were carried to term or not while the latter usually considers only the life birth order.

After reviewing the literature concerned with what one may call "success" variables and birth order, one fact seems to stand out: first borns have an advantage over later borns. The exact nature of that relationship is not quite as clear, however. It does seem that first borns are overrepresented in college, although there is some confusion as to whether their chances of going to college are any greater than the chances of later borns. In addition, when one considers the siblings from the same family, sex seems to be an important factor. First borns from cross-sex families are the ones that seem to have the educational advantage, and there is some evidence that social climates make cross-sex families more popular, thereby increasing the proportion of cross-sex families and indirectly increasing the chances of the first born.

First borns also seem to have both better grades and better achievement scores, regardless of educational level. This, of course, could be considered a partial explanation for the incidence of first borns in college.

However, whether this higher level of achievement is attributable to higher intelligence is highly problematic and would not, by most authors, be considered a legitimate reason for the achievement.

There is less information concerning achievement after education. Nonetheless the evidence indicates higher achievement for first borns concerning both quality and quantity of education, and preliminary data from Blau and Duncan (1967) indicates that first borns also have higher occupational prestige scores. However, birth order, family size and occupational achievement are all closely related and the relative strengths of sibling position and family size are still unknown.

Finally, it was seen that the research on birth order differences for other ethnic and cultural groups is scarce, and what research there is tends to be inconclusive. Once family size is taken into account, there seems to be an overrepresentation of first born Spanish-Americans at one American University. However, for Arab students at an Arab University, no such pattern is obtained. Additionally, birth order is not a very good predictor of educational plans for black high school students from the South and is only a slightly better predictor for the white high school students. Perhaps more important, it was seen that for the high school students, family size was far more important than birth order. Since there is only one study per ethnic group, we cannot make any generalizations concerning birth order effects within ethnic groups.

Therefore, as discussion turns to an investigation of the possible theoretical reasons for birth order differences, it will be assumed that the same forces are operating within the ethnic group as elsewhere.

CHAPTER III. THEORETICAL FRAMEWORK

This chapter is concerned with making predictions about the behavior of first borns relative to their later born siblings based on a theoretical framework which has been developed from the literature. However, as has been seen in the last chapter, there are several different approaches to the study of birth order which could be used. Therefore, there will be a review of all the different orientations in order to clarify the reasons for using the ones which will, in fact, be used.

After choosing a framework, that framework will be developed by drawing on the literature dealing with child-rearing practices, family relationships and personality differences among sibling positions. From this model inferences will be made about the expected behavior of adult first borns versus adult later borns.

Frames of Reference

Bayer (1967) mentions three frames of reference or approaches utilized to interpret findings concerned with birth order and achievement. The first which he discusses is one with which the reader is already familiar: a physiological frame of reference. To recapitulate, this model postulates that intrauterine and perinatal influences account for the variation associated with birth order outcomes. That is, the researcher either posits that the physiological environment for the fetus lessens in quality for each succeeding birth and for the increasing age of the mother; or he posits that each succeeding birth is "easier" physiologically for the mother, thereby making it "better" for the child; or he combines the two positions. The first orientation anticipates better abilities among the first born; the

second expects later born siblings to have a greater ability while the last expects greater variation at either extreme.

While this kind of orientation should be acknowledged for its usefulness, it will not be employed in this paper. The physiological orientation requires controls and information which simply are not available. In addition, the primary interest is in those differences which are due to the social situation and we feel that any differences which originally might have stemmed from physiological differences will, by adulthood, have been overshadowed by the social-psychological differences.

Therefore, the main frame of reference to be employed here is social-psychological. Although the ideas and assumptions incorporated under this orientation will be considered in more detail in a later section, it basically rests on the assumption of differential socialization patterns among different birth positions.

The third orientation is based on economics. Bayer (1967) notes that, as with the physiological orientation, there are alternative hypotheses which suggest several different outcomes. On the one hand, it is argued that the first born gets first chance at family resources, thereby making it easier to complete his education. In addition, it is reasoned that the first born will use up a disproportionate amount of family finances, making the financing of education for later borns more difficult (Bayer, 1967, p. 543). Nevertheless, he also notes what Clark suggested in 1916; that the first born may be called upon to help finance the education of later born children (Clark, 1916, p. 84). However, this would assume enough distance between children to allow the first born to complete his education and be in the job market before the later born begins his education. This reason-

ing would probably be more apt among larger families, since the larger the family, the greater the possible distance in ages between first and later born siblings.

These three orientations do not necessarily compete with one another. Because an author utilizes one does not exclude the possibility that another is also adding to the variation in the dependent variable. This study will incorporate the social-psychological and the economic orientations into the model to be used. In the analysis, some estimation of the relative weight or importance of each of the orientations will be attempted.

The Social-psychological Model

Theoretical basis

In order to account for the differential achievement patterns noted in the last chapter, most authors have called upon the studies dealing with child rearing practices and personality variables to explain the behavior attributes of first borns. For example, Blau and Duncan (1967, p. 296) have noted:

It is from his parents that a child acquires a cognitive structure and linguistic patterns, which serve as basic equipment in the competition for occupational success. The achievement orientation that disposes the man to strive to better himself is acquired by the child largely in his parental family. Conditions in the family of orientation tend to determine both whether the child develops the socialized anxiety that drives him to succeed and whether he receives the socio-emotional support to cope with this anxiety without becoming debilitated by it.

While other authors might debate with Blau and Duncan on the importance of "achievement orientation" and "socialized anxiety" as opposed to other personality variables (Sampson, 1962), few of the authors would debate with them on the importance of including family of orientation as a variable.

The obvious question arises as to how the family of orientation differs for first born and later born children and further, how these differences produce the differences in behavior which have been explored in the previous chapter. Schachter (1959, p. 79) notes that the "first birth is an event of profound psychological and philosophical importance for the parents and that later births are events of considerably less moment." He goes on to say that "common sense would suggest that the relative importance of the events plus the experience of the parents would have sweeping general implications for parental feelings about and behavior toward each of their children" (Schachter, 1959, p. 79).

Commenting on the parents behavior toward the first child, Sears et al. (1957) found that parents seemed to be more inconsistent with the first child than with the later born children. Koch (1956a) and Phillips (1956) also noticed the inexperience of parents with the first born child. Furthermore, they suggest that this inconsistency leads to the consequent frustration of the child's needs and demands, resulting in greater dependency of the first born on his parents than the later born. The correlary was found to hold by McArthur (1956) who pointed out that parents are more permissive and less cautious with subsequent children. In addition, Koch (1956a) reported that parents pay more attention to the first child and Rosen (1961) reported that parents talked and interacted more with their first child.

As a result of the attention received by and the inconsistency experience by first borns, McArthur (1956), Schooler (1961) and Rosen (1961) have all suggested that first born children are more adult oriented. That is, they are more serious and sensitive than later borns who seem to be more

relaxed and peer-oriented. This adult orientation is also closely linked with the observation of Schachter (1959) and Sears, Maccoby and Levin (1957) that first borns are more dependent on their parents than later borns. However, in what seems to be a contradiction, Harris and Howard (1968) found that first borns are more responsible. The question arises as to how a child who is more dependent can also be more responsible. The answer lies partially in the definition of responsibility. Harris and Howard (1968, p. 427) comment:

The main hypothesis was that first sons -- due to an interaction with parents, more requiring of compliance with moral injunctions and adult expectations -- tend (in comparison to later sons) to internalize more strongly these injunctions and expectations with a resultant stronger sense of serious moral responsibility.

In addition to the distinction noted by Harris and Howard, Hilton (1967) who found that first borns were more dependent on parents than later borns, says concerning the dependence-responsibility conflict:

Initially, it is important to keep in mind in evaluating these results that this is a conception of dependence as the extent to which other people are used as sources of support and reference. It does not necessarily imply that 'independence' in the sense of going out on one's own or taking responsibility (care of younger siblings) would be a contradiction ... The distinction that must be made, however, is between psychological independence, 'to thine own self be true,' and the physical appearance of independence; the assumption of responsible roles. This physical demonstration of independence is frequently an internalization of the values of the adult culture -- not an expression of what the child wanted to do (Hilton, 1967, p. 288).

Therefore, what begins with the inconsistency of the new parents toward their first child leads to frustration of the child's needs and furthermore, leads to his dependency on his parents. This, combined with the fact that adults are the child's only reference group for the first few years of his life, produce a child who is more adult oriented than his later brothers

and sisters. In his striving to "please" or "be like" the adults he knows, the child assumes physical forms of responsibility and independence.

In addition to the psychological mechanisms at work, the child is also learning the adult orientation through role expectations and role training. Perhaps the best documented expectation pertains to the pressure placed on the first child to achieve and be responsible (Davis, 1959; McArthur, 1956; Rosen, 1961; Sampson, 1962; Sutton-Smith et al., 1964). In addition, Sutton-Smith et al. (1964) noticed that the first born child seems to prefer or at least assumes a parent-surrogate role more often than later born children. Davis (1959) also noticed the tendency of the parents to pressure the child to achieve high social status. Parents expect the first born to realize their future expectations for them more than they do for later born children (McArthur, 1956). Cobb and French (1964) also found that the father projects his occupational aspirations onto the first child, especially if he has not realized them himself.

To summarize, it seems as if the parents' actions toward the first child inadvertently make him more adult oriented at the same time that they are consciously training him to be that way. Sampson (1965, pp. 220-221) gives a very enlightening description of the "ideal type" first born:

The first child occupies the center stage in a drama whose participants include two rather inconsistent, somewhat anxious and confused actors, who nevertheless are proud of their product and wish him to obtain the skill and attributes which they lack and to attain heights which they long for but find themselves frustrated in reaching. They wish him to progress with lightning pace, yet often act in ways which only serve to increase this dependency on them. And the child himself, alone in this most confused world, turns toward his parents, looming so large, so powerful, so distant, and uses them as his model for coping with the complexities he daily encounters.

One day, another is born.... The second child grows up looking outward upon a world of peers and learns those skills required

for coping with similars. The first child grows up looking inward, for without there lies a world of still powerful adults, a more difficult breed to handle, a breed requiring a different set of skills.

Together they grow up, each moving forward, but down a different path. For the first, still driven by the now internalized desires of his parents, education and intellectual achievement become important. He turns toward the world of thought, leaving the world of people, and sociability, and play to the younger member of his family.

Sampson's statement might be considered a composite "picture" of a first born and will be the picture on which the ensuing investigation will be based. As has been mentioned elsewhere, this paper is interested primarily in looking at the observable consequences of birth order that manifest themselves in adulthood, not at looking at child rearing practices and personality per se. The child rearing practices and role expectations are important only in so far as they form the basis for predictions about the behavior of first borns. Although a more specific model of expectations will be developed in later chapters, the social-psychological frame of reference developed above will be used to generate some general hypotheses.

Predictive model

Since the first born internalizes the norms of the adult world more than later borns, and since his is pressured by his parents to succeed, we can most reasonably expect to find differences between first and later borns in those areas that are considered indicators of one's success, such as education, income and occupation. However, to say without reservation that first borns will do better educationally, occupationally, and income-wise would be an oversimplification, for it has been seen from the review of the literature that there are interfering factors. Besides considering the effects of such things as family size and class of origin, it should also be

noted that the author is dealing with a subgroup of the American population that has inadequately been investigated for birth order effects. Therefore, in attempting to derive hypotheses, three things should be kept in mind:

1) the author is dealing with a type of person who is most comfortable in adult-oriented rather than peer-oriented surroundings; 2) this person's behavior is going to be affected by other factors of his environment, such as class and family size; 3) this individual will have a racial group identification which may affect his behavior.

Education In the most general case, one would expect that first borns will do better educationally than later borns. This means that:

Hypothesis 1: There will be a greater proportion of first borns involved in and completing a given level of education the higher that level of education.¹

Not only are the first borns performing for and being judged by an adult population -- teachers and parents -- but they would be the most likely of all siblings to have internalized the parent's values on education. How far a first born goes in school and how well he does while there will partially be a function of the emphasis placed on education by his parents.

While education might rightly be called an American value, Mizruchi (1967) has demonstrated that education is not valued uniformly throughout the social classes. He notes that "success relative to a lower class position can be achieved with high school education alone" (Mizruchi, 1967, p. 107). This was his conclusion after analyzing the degree of importance attributed

¹This will apply, of course, only to those levels of education where attendance is not compulsory.

to symbols which the various classes associated with success. He found that:

Home ownership tends to become the most important symbol of success as class position declines. Job security as a symbol also shows a slightly similar tendency. However, education tended to be selected as the most important symbol of success as the class position of the respondents rose (Mizruchi, 1967, p. 105).

Therefore, one will expect that

Hypothesis 2: First borns, relative to later borns from the same class, will strive to be involved in and complete more education the higher the social class of origin.

Implicitly, this means that the difference between the first and later borns will be greatest for the highest social classes. In fact, one may find no differences between the first borns and later borns from the lower social classes. This relationship is illustrated in Figure 1 by the interaction (marked by an asterisk) of class with birth order and education.

In addition to the number of years of education pursued by first borns, there are two other educationally related factors to consider; one readily apparent, the other not so apparent. The first is scholastic achievement. It has already been shown that there is both theoretical and empirical evidence to support the contention that first borns will have higher scholastic achievement than later borns. Although no one has attempted to investigate the scholastic achievement in college, the evidence shows that first borns in both high school and grade school, regardless of class, do better scholastically than later borns. In addition, although it has been posited that the relationship between birth order and years of education may not obtain for the lower classes, there is nothing to suggest that the first borns who do go past high school will do poorer academically than their later born

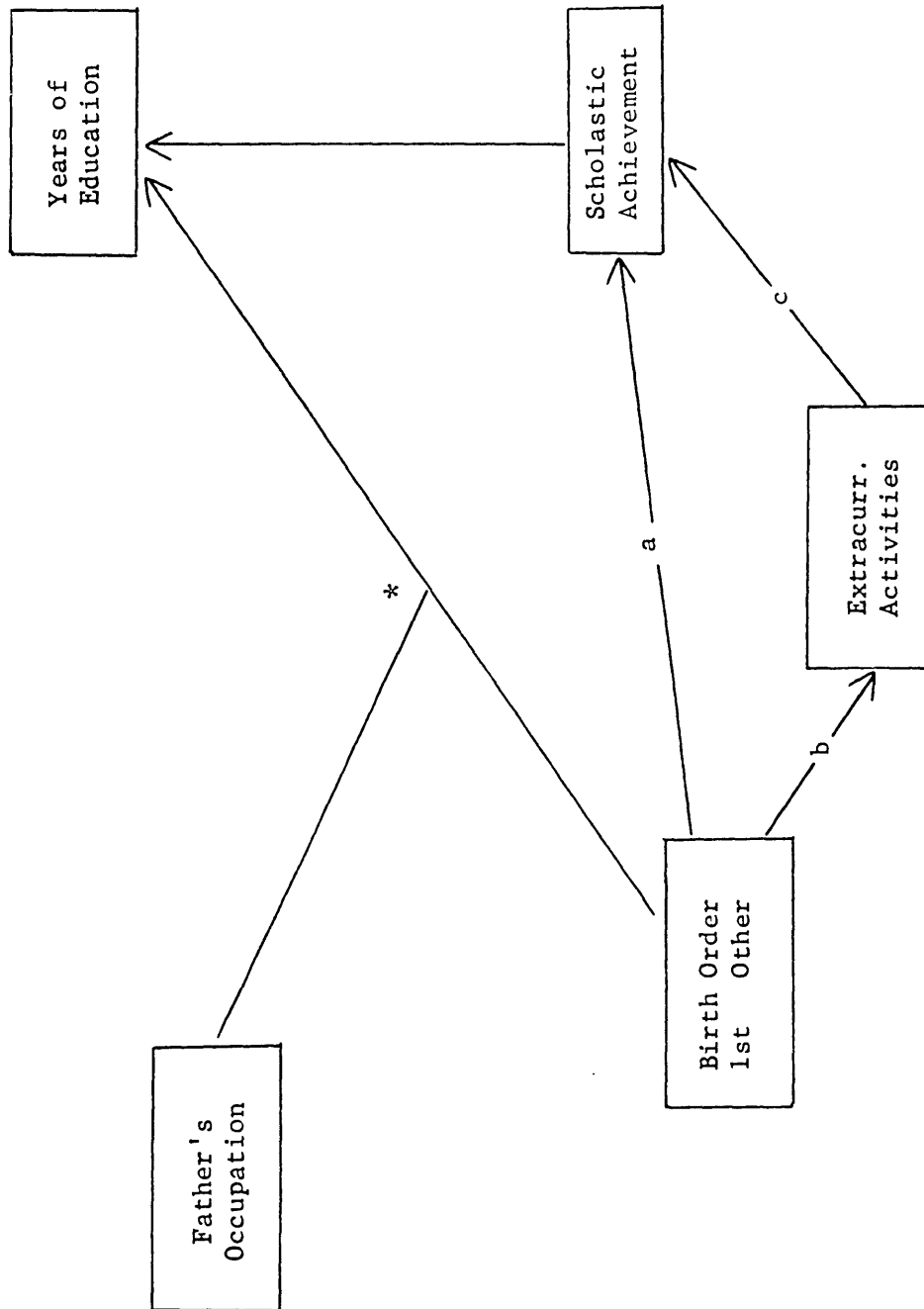


Figure 1. Effects of birth order, scholastic achievement and activities on years of education

counterparts. Therefore, one will expect that

Hypothesis 3: First borns will have higher scholastic achievement than later borns.

This is shown in Figure 1 by path (a).

Sampson (1965) posits from a theoretical point of view what Schachter (1964) noticed empirically: the first born is more adult oriented while the later born is more peer oriented. This orientation might also help explain the differences in grades. That is, the later born is more concerned with socializing while the first born, being either rejected or not caring, concentrates more on grades and studying. In school, one might expect this tendency to show up in extra-curricular activities. More specifically, it will be expected that:

Hypothesis 4: First borns will be less active in extra-curricular activities than later borns.

Besides, one might expect that the less active a person is in extra-curricular activities, the better that person's grades will be. In Figure 1 this is indicated by paths (b) and (c), both of which are negative, indicating negative relationships. The product of these two paths would equal a positive path which is what was predicted in path (a).¹ Figure 1 is now the completed picture in diagram form of the basic prediction concerning birth order and education.

Finances Leaving the social-psychological model for a moment and turning to the economic level, we find another variable is found which is

¹Both (b) and (c) are the indirect paths from birth order to education, while (a) is the direct path. It should be noted that it is not necessarily the case that the product of two indirect paths will equal (in sign) the direct path.

directly related to education. The economic model states that the first born will have primary access to family resources. This would give him a better chance of going to college than the later born who would have to find alternative means of financing his education. Therefore, one would expect a positive relationship between birth order and being financed by parents, and a positive relationship between financing and years of education. More specifically:

Hypothesis 5: First borns will be financed in school by their parents more often than later borns.

Hypothesis 6: Persons who are financed in school by their parents will be involved in and complete more education than persons who are not financed by their parents.

This would result in the expected positive relationship between birth order and education. Therefore, in order to complete the picture of the educational advantages for the first born, means of finances should be included, as has been done in Figure 2.

Another advantage of using diagrams instead of verbal descriptions is that it forces the researcher to consider all the possible relationships and not simply the ones in which he is primarily interested. For example, as soon as means of finances are added to the causal model (Figure 2), one must not only consider the effects of birth order on finances and education but the effects of other variables on finances and vice versa. Logically, there are two additional paths which must be added to Figure 2. First, regardless of birth order, those students from families with lower father's occupations would have the least chance of being financed by their parents. Put another way, this says that assuming that there is a strong correlation between

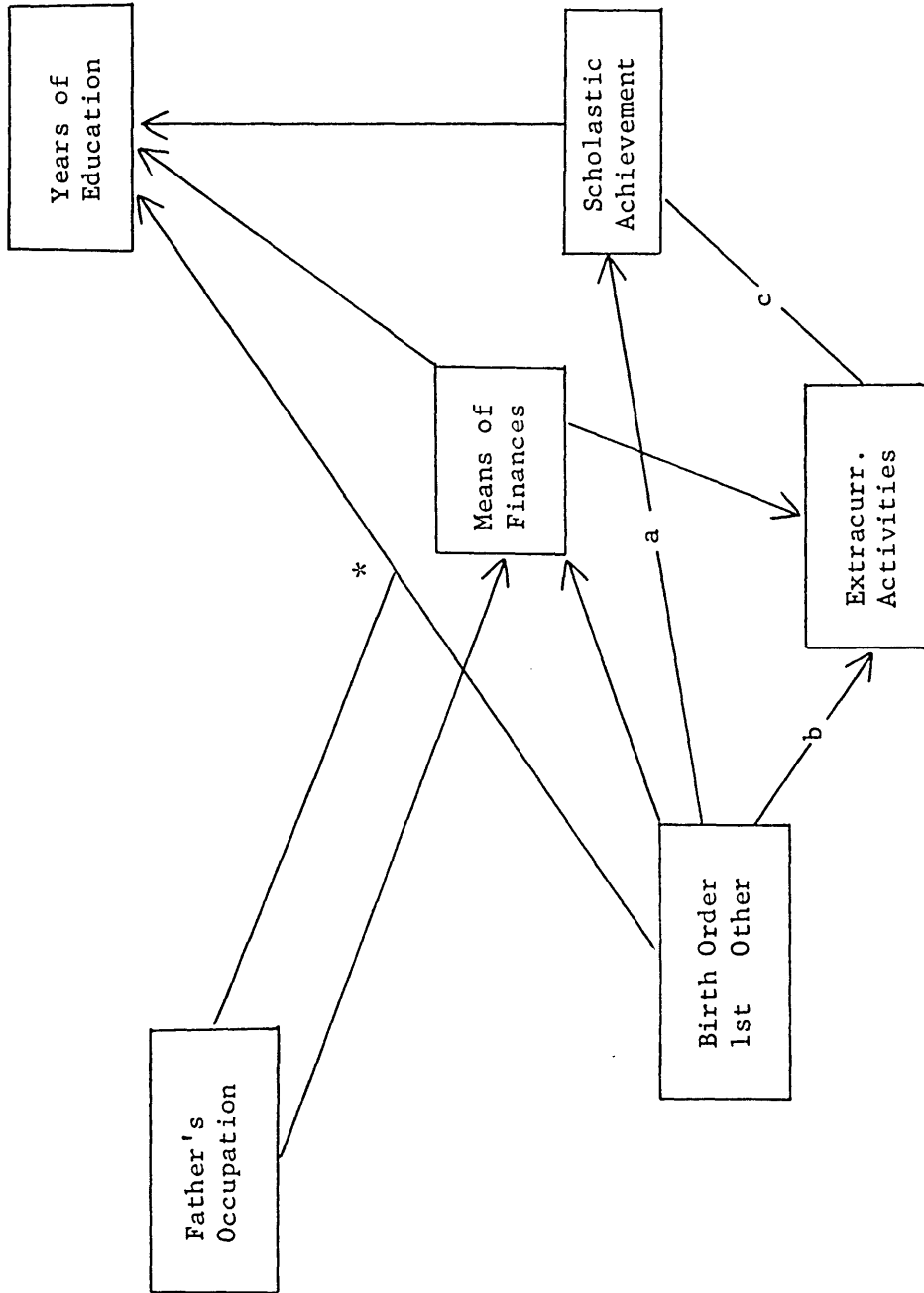


Figure 2. Effects of birth order, scholastic achievement, activities and means of finance on years of education

father's occupation and father's income, the higher the occupation, the greater the amount of money available for education. Second, the amount of time available to a person for extracurricular activities might well be a function of how his education is financed. Those students who are being financed by their parents, and who therefore are not concerned with earning money or keeping grades up for scholarship assistance will, in all likelihood, have more time for extra-curricular activities. These two additional relationships are indicated by the positive paths between father's occupation and means of finance and between means of finance and extra-curricular activities.

Occupation and income Until this point in the discussion, the author has primarily been concerned with the effects of birth order (the independent variable) on amount of education (the dependent variable). As can be seen from the review of the literature, this relationship has been thoroughly investigated. Much less is known about the relationship between birth order and other components of achievement, i.e., occupation and income. However, what little research has been done suggests that these components follow the same type of patterns that we predicted for education. More important than past research, however, is whether one can make the same type of predictions based on the theoretical model that has been developed.

In school, a person is essentially operating within an adult world. That is, there is a definite evaluative system (grades and recommendations) that is administered by persons of authority (instructors). It has been eluded to before that the first born does well in school in part because he is the type of person who is well liked and is given encouragement by those in charge; he is more interested in pleasing those persons who represent

the "adult world" than is the later born. The later born is more interested in being liked and liking those who he considers to be peers. The first born looks "up"; the later borns look "sideways". In order to make predictions about the success of the first born in the economic sphere, then, one must examine the occupational milieu to see whether it is an adult oriented world or whether it is a peer oriented world.

By the time a person finishes school and enters the job market full time, he is working with peers. However, those peers, at least the ones responsible for promotions and success, will be interacting with him as a superior rather than as a friend. And these superiors will be in a position to judge the first born in much the same way that he has been judged by parents and teachers. That is, while the ages of the two persons may be similar, the amount of power associated with each person's role will not be equal. Like a parent, the superior in the work world will have quite a bit of authority over the life chances of the worker. It was in precisely this type of situation that the first born excelled before and there is no reason to expect him to behave differently now.

However, to the extent that promotions and raises are based on informal networks, i.e., friendship, then one would expect the first born's advantage to be diminished somewhat and the advantages of the later born increased. While the importance of informal networks in organizations has been noted more and more frequently in the literature, it has most frequently dealt with the effectiveness of work flow rather than with mobility within an organization (see Barnard, 1970). Therefore, it will be assumed that whatever advantage the later born might gain from informal networks will not offset the importance of that gained by the first born.

Consequently, we will expect that:

Hypothesis 7: First borns will be in higher prestige occupations than later borns.

However, it may be the case that the differences between the first and later borns in this case will not be as great as in education.

There is only one situation where this relationship might not prevail. According to Blau and Duncan (1967), educational and consequently occupational attainment is inversely related to family size; persons from small families have an advantage over those from large families. However, they found that once a person from a large family graduated from college, he tended more than the person from the small family to keep going with his education. Subsequently, he ended up with a higher occupational level than the one from a small family. This same type of interaction may hold for birth positions. That is, although one may expect the first born to have an advantage occupationally, one may find that the later born from a large family, once he gets past the initial hurdle of college graduation will do better than his first born elder. In other words:

Hypothesis 8: First borns from large families will have lower prestige occupations than later borns from large families while first borns from families of other sizes will have higher prestige occupations than later borns from the same family size.

Turning to Figure 3, the reader can trace this rather complex interaction by looking at the asterisk on the path from birth order to respondent's occupation. It is then possible to see how this interaction of education and family size simultaneously affects the occupation of the respondent.

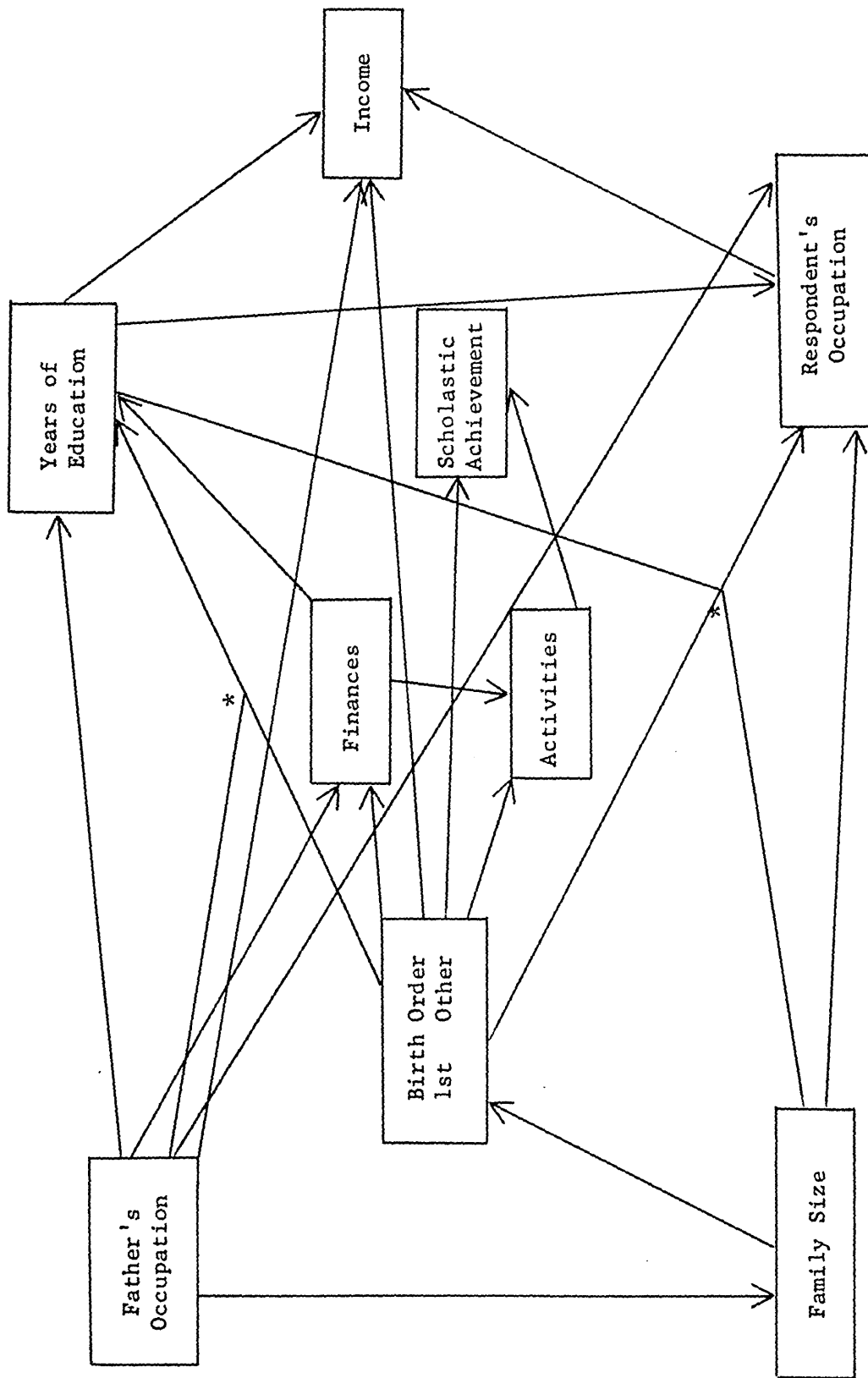


Figure 3. Effects of birth order, scholastic achievement, activities, means of finance, father's occupation and family size on respondent's years of education, occupational prestige and income

In addition to occupational attainment, there is reason to believe that first borns will also have higher incomes. Following the same reasoning as was set forth for birth order and occupations, it might be seen that:

Hypothesis 9: First borns will have higher incomes than later borns.

Family size will interact with the birth order income relationship only in so far as occupations affect incomes.

Restrictions It is readily apparent from looking at Figure 3 that not all the relationships which logically make sense have been discussed. The reason is very simply that at this point we are interested only in those relationships dealing with birth order. The others, for example, the effects of father's occupation on years of education, enter in because we are interested in their strengths relative to the birth order effects. However, they will not be discussed here from a theoretical point of view but will be covered when the analysis is discussed.

The other factor which becomes apparent on examining Figure 3 is that race has not been introduced as a variable nor has its effects been discussed. Since so little research has been done on the birth order effects among blacks, the same model will be posited for blacks as for whites, or:

Hypothesis 10: The same differences between first and later borns will hold for blacks as well as for whites.

However, from the work that has been reviewed (Cramer et al., 1966) one might expect that the relationships will not be as strong for blacks as for whites, particularly concerning background factors. Since background factors include birth order, one should expect that the ordinal position will not be as good a predictor for blacks as for whites.

Summary

The theoretical model which has been developed is one based primarily on differential role patterns for first borns as compared to later borns. These role patterns originate in the child-rearing practices of the parents, and the adult orientation that results tends to reinforce itself throughout his childhood and into adulthood. That is, the adult orientation makes him seek to please adults. They in turn are pleased by his behavior and seek him out in order to give him attention. It is this attention and guidance by adults which seems to account, in part, for the observed achievements of the first born.

Based on this theoretical model, the author was then able to predict the various components of what might be considered the achievement-success aspect of the person's adult life. The three main components were considered to be education, occupation and income. In general, one expects the first born to do better in all three of these areas. However, it was estimated that father's occupation and family size would, in special cases, change this achievement component. In other words, some interaction will be expected between birth order outcomes and father's occupation and birth order outcomes and family size. In addition, the effects of other variables besides birth order on the three dependent variables were noted diagrammatically but not discussed from a theoretical point of view.

The next step in research is, of course, to put the above hypotheses to an empirical test. However, before doing so, it is necessary to explore the type of sample which will be used and also investigate methodological problems which could interfere with the analysis. Therefore, the next chapter will draw on matters of methodology.

CHAPTER IV. METHODOLOGY

The sample on which this study is based, consisting of over 900 black and white college graduates, was originally part of a larger study of income differences and the components of discrimination between the two racial groups.¹ In an attempt to equalize the blacks and whites on such potentially interfering factors as quality of education, social class background and ability, the blacks and whites were chosen from three universities of comparable equality and were then matched on father's occupational prestige, cumulative grade point average, and year of graduation. While the conduct of that survey and the matching process will be discussed later, it should be noted here that the matching was done so that differences between the racial groups on such factors as income, occupation, and education could be attributed to race and discrimination instead of the interfering factors.

However, this study is not as concerned with differences between groups as it is with differences between the birth order positions within each racial group. Therefore, the problems usually associated with using matched samples, the author contends, will not seriously affect the analysis in this study. Nonetheless, the impact of the matching process on the data must be seriously considered in order to determine if other kinds of

¹The larger study will be reported on in an extended monograph to be published in 1971. The project was conceived by the late Sydney S. Spivak of Princeton University who served as its Research Director. Robert P. Althaus, also of Princeton University, has served as Research Associate for the last three years. The following organizations partially supported the larger study: the College Entrance Examination Board, and the Ford, Carnegie, Esso Education, Alfred P. Sloan, New York, Woodrow Wilson National Fellowship, Seth Sprague Education, John Jay Witney, Field and Roger Williams Straus Memorial Foundations.

problems arise. This chapter, then, will be concerned with these considerations.

The discussion will first focus briefly on the conduct of the survey and the resulting composition of the sample. Next the four hazards to matched samples will be discussed, paying particular attention to why these hazards will not seriously affect our analysis.

Secondly, several methodological problems will be discussed arising from the nature of sampling itself. This section will be devoted to the representativeness and the generalizability of the sample.

Last, the author will concern herself with a discussion of selection of another sort. That is, the effects on our study of limiting the study to college graduates will be evaluated.

The Sample

The college graduates in the survey, which was done in three stages, were drawn from three universities in the Eastern region of the United States. Two of the universities were integrated schools while the third was a predominantly Negro university. That the schools were comparable in quality of education can be seen using a measure devised by Astin (1965). This measure consisted of two parts: a measure created by factor analysis, called "intellectualism" which primarily reflects several other common measures of scholastic aptitude and a measure of "selectivity" or the level of ability of a student body. Scores for both the "intellectualism" and "selectivity" measures had means of 50 and standard deviations of 10 (Astin, 1965, pp. 77-83). Taking an average of the two measures, it was found that the two integrated schools scored 55.5 and 56 respectively while the Negro

university scored 54.5. Thus by these measures, the school offered education of comparable quality.¹

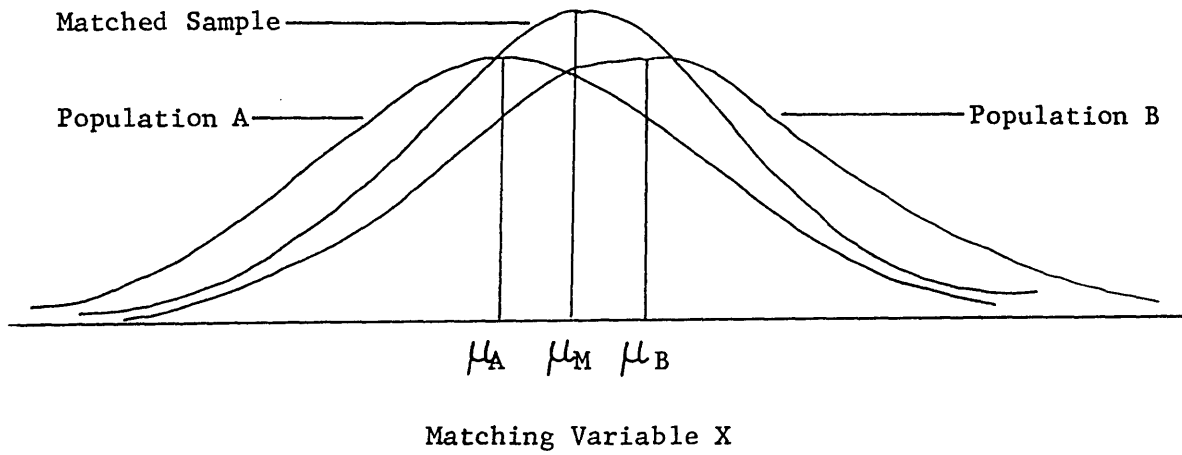
Unlike most matched samples, the respondents from the three schools were not all chosen and interviewed simultaneously. Figure 4a illustrates the "usual" matching process. Here both matched groups are sampled at the same time, resulting in a large number of the members of the matched sample falling in the region between the population means of each group on the matching variable. The second situation is shown in Figure 4b. First, a complete or random sample of one of the populations is taken first and then members of the other group become a pool from which individuals are drawn to match those previous samples. In this case, the matching variable mean for the matched sample more nearly approximates the mean for the first population interviewed. This situation describes the approach used in matching the graduates in this study.

First, all of the available male black graduates from the two integrated universities who graduated between 1931 and 1964 were interviewed by the National Opinion Research Center.² They were interviewed first because there were fewer of them and also there was less accurate information about their father's occupation than was available about the other two populations. After this process was complete, two lists of potential matches were constructed. The first contained names of random selection of the white

¹As a means of comparison for the reader, several other colleges and their scores have been listed below: Howard (52); Morehouse (51.5); N.Y.U. (62); Iowa State University (61); Princeton (70.5); Harvard (77).

²The sample was limited to males since both occupational prestige and income were important variables and since women more often tend to be out of labor market.

a. Situation I



b. Situation II

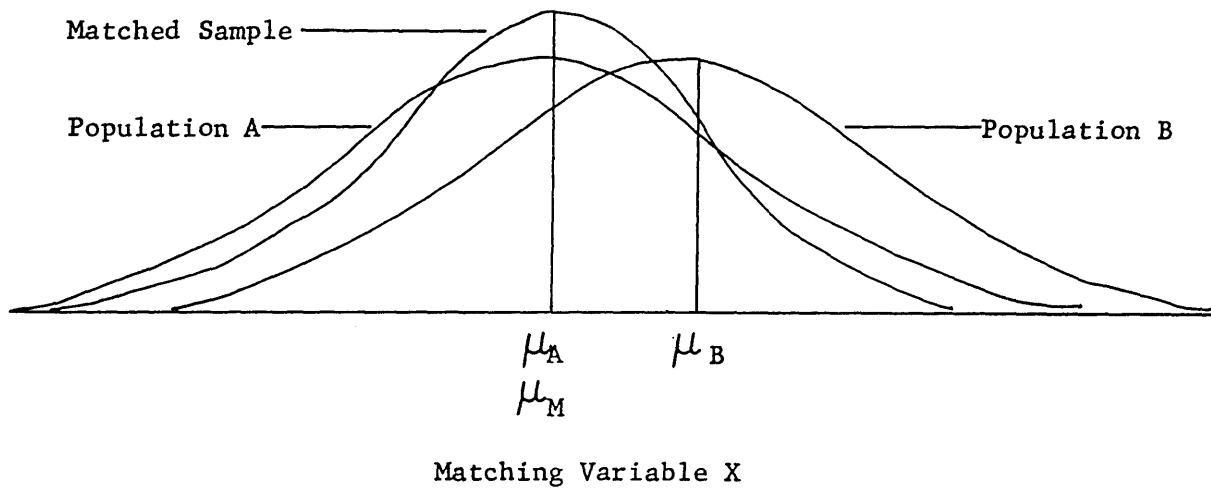


Figure 4. The two sampling situations in which matching can be carried out

graduates from the two integrated universities who had graduated in the same time period. This list contained the names of 2,420 whites from one school and 3,200 names of whites from the other school. The other list contained the names of 1,638 Negro university graduates from 1931 to 1964. Information on each of the white and Negro graduate's year of graduation, cumulative grade point average and on their father's occupations were obtained and matches were then constructed using a randomized, computerized procedure.

Usually there were from ten to twenty white graduates listed for each of the black graduates from the integrated universities. The second list also contained a random sample within classes. However, often all of the graduates within a class were included due to the smaller population size.

Although the matching procedure is described in more detail elsewhere (see Althausen and Rubin, 1970a), it will briefly be described here. First, the white graduates from the integrated universities were matched to the blacks from the same universities and then the blacks from the Negro university were matched to the integrated blacks. The matching procedure was the same in both cases: each of the graduates in the above mentioned lists were assigned random numbers and the computer was then programmed to choose the "best" matches for each of the blacks.¹ From the list of potential matches, an interview was attempted with the person with the lowest random number. If this match was found unfeasible (i.e., the respondent was unable to be located or was out of the interviewing area or refused or due to poor information did not match), the next lowest match with the lowest random number was tried. This procedure continued until successful matches were found for

¹A "best" match will be defined later (see page 80).

the integrated blacks.¹

Operational Measures

This section will be concerned with operationally defining the concepts put forth in Chapter 3 dealing with theory.

Birth order

After reviewing the various conceptions of birth order as put forth in the literature, it was shown that the social-psychological frame of reference was the best one to be employed in this study. The live birth order was measured by the following item:

How many brothers and sisters or other children were living in the household with you while you were growing up? (Do not include any who died before their 6th year.)

- How many boys were younger than you?
- How many boys were older?
- How many girls were younger?
- How many girls were older?

Eliminating any siblings who died before their sixth birthday eliminated the possibility of including siblings who never really became part of the social-psychological family setting.

The respondent's exact position within the family setting was then calculated from the data from this question. Furthermore, it was decided to

¹Due to the fact that the matching was taking place among three different samples, it was not always possible to find both a white and a Negro match for each of the integrated blacks. Therefore, the final sample contained 282 integrated blacks, 281 integrated whites but only 276 blacks from the Negro university.

use four birth positions -- only, first, middle, and last -- rather than the birth number -- first, second, third, etc. As Clausen (1968) and Sampson (1965) have noted, the four positions have more meaning psychologically and sociologically within the family than the simple birth number within the family. A third born who is also a last born may have less in common with a third born who is a middle child than with a fifth born who is also the last born.

Main dependent variables

In addition to the main independent variable birth order, there are three main dependent "success" variables under study in this paper -- education, occupation and income. The measures of these variables will be discussed next.

Education All of the respondents included in the sample had either a bachelor's degree or an associate degree. This level of education was obtained from school records before interviewing began. Additional education was measured by the following item:

Did you enroll or are you presently enrolled as a matriculating student for a postgraduate academic or professional degree at any time after college? (If yes, or presently enrolled, ask the following.)

-- What was your graduate field of study?

-- Did you receive a degree?

What degree? (any other?)

What year did you receive this degree?

The average or "usual" number of years needed to complete each of the vari-

ous degrees on a full-time basis was estimated to be as follows:

-- Associate degree	14 years
-- Bachelor's degree	16 years
-- M.A., M.B.A.	18 years
-- B.P., S.T.B., S.T.M., S.T.C., L.L.D., L.L.B.	19 years
-- Ph.D.	21 years
-- M.D., D.D.S.	22 years

The degree received by each respondent was, therefore, transformed into the approximate number of years of education needed to obtain that degree.

Occupation The respondent's present occupation was obtained by the following questions:

What is your present occupation? (Primary occupation, if more than one.)

In what kind of business or industry is that?

The two questions were asked in order to better code the occupations via the Duncan scale for prestige ratings. This scale was obtained from a large sample of the United States population in 1947. Scores, computed from regression weights, were assigned to all census occupations on the basis of their education and income distributions. The scale itself is represented by two-digit numbers ranging from 0 to 96, and the scores may be interpreted as estimates of prestige ratings or simply as values on a scale of occupational socioeconomic status (Blau and Duncan, 1967, pp. 117-128).

Income Through the use of the following income scale, it was possible to obtain a good estimate of the real personal income of each respondent.

What was your personal income in 1966 -- before taxes, from all

sources such as rents, profits, wages, interest?

- No income
- \$ 500 to under \$ 1500
- \$ 1500 to under \$ 2500
- \$ 2500 to under \$ 3500
- \$ 3500 to under \$ 4500
- \$ 4500 to under \$ 5500
- \$ 5500 to under \$ 6500
- \$ 6500 to under \$ 7500
- \$ 7500 to under \$ 8500
- \$ 8500 to under \$ 9500
- \$ 9500 to under \$10500
- \$10500 to under \$13500
- \$13500 to under \$16500
- \$16500 to under \$19500
- \$19500 to under \$22500
- \$22500 to under \$25500
- \$25500 to under \$34500
- \$34500 to under \$55500
- \$55500 to under \$85500
- \$85500 to under \$94500
- \$94500 or over
- Don't know, refused (estimate).

Since there were only eight respondents out of 930 for whom no income data was available, the author decided to drop these respondents from any analysis involving income. Each category was coded as the mean of that category.

Therefore, incomes ranged from \$0 to \$94,500.

Other dependent variables

The subsequent discussion will focus on the measures of the three education-related variables of cumulative grade point average, extra-curricular activities, and means of finance.

Cumulative grade point average The grade averages were obtained from the university transcripts before the interviewing began. Because the three schools had different grading systems, all grade averages were transformed into the following scale:

- A = 1.0
- B = 2.0
- C = 3.0
- D = 4.0
- E = 5.0

Extra-curricular activities The following question was asked in order to ascertain the number and type of activities in which each respondent engaged.

While in (undergraduate) college, in which of these extra-curricular activities did you engage? For each organization engaged in: Did you hold any office in that organization?

- Varsity and other sports
- College paper, yearbook, magazine
- Choral, orchestra, band
- Dramatics, debating
- Religious, cultural society

- Student government
- Social fraternities
- Academic society
- Political activities
- Other

From this information, it was possible to determine not only the number of activities in which a respondent had been engaged, but also the amount of involvement in each organization. An activity index was constructed by assigning each activity participated in as one and each office held as two. Therefore if a person had participated in two activities and been an officer in two, his activity index would equal six. Since ten activities were listed, the possible scores ranged from zero to twenty.

Means of finance Each respondent was asked, in the following manner, how he had financed his education.

Which one of these sources contributed most to your (undergraduate) college costs?

- Money I earned
- Money I borrowed
- Contributions of parents
- Contributions of other relatives
- Scholarship
- G.I. Bill
- Other sources
- Don't know

Since the economic frame of reference only suggested that first borns would have first access to family finances, the author decided that a dichotomous

grouping was appropriate. This grouping consisted of parents as one category and all other sources as the other category.

Interaction variables

Two other variables, father's occupation and family size, will be employed in this study in order to see if they interact with the relationship between birth order and the dependent variable. The measures of these variables are therefore important.

Family size The size of the respondent's family was ascertained through use of the same question used to obtain birth order. For the specific wording of this question, see the discussion of birth order.

Father's occupation Father's primary occupation was obtained through the following question:

During his lifetime, what kind of work did he do mostly? In what kind of business or industry was that?

Father's occupation was also coded by the Duncan scale used for respondent's occupation.

Analysis Procedures

Two main types of analysis procedures will be used in this study. The descriptive analysis will involve an examination of the means for each of the birth order positions on each of the dependent variables, and where means are not applicable, the percentage distribution of the dependent variable within the birth order categories will be used.

In addition, the coefficient of multiple determination will be calculated for each equation both with and without birth order variables. Second, the beta coefficients for the proposed paths will be obtained from regres-

sion analysis. These measures will be discussed as they arise in the analysis chapter.

Hazards to Matched Samples

As mentioned previously, there are four obstacles usually associated with using a matched sample: selection, regression to the mean, attrition and imperfect matching. The first two are affected by and subsequently affect the interpretation of the data while the latter two are affected by one's approach to the construction of the sample. Each of these hazards will be briefly defined and then the author will discuss why that hazard does not affect the data.

Selection

Selection occurs when a spurious relationship between the match and dependent variables arises as a consequence of the correlation of one or more extraneous variables with the match variable. Selection would be present, therefore, if being black or white were differentially correlated with some unmeasured and uncontrolled variable that caused income differences between the two groups. For example, suppose that whites were more ambitious than blacks and that more ambitious people had higher incomes. Unless this variable were taken into account, one would end up seeing a large income difference between blacks and whites. Depending on the theory, this difference would be attributed to discrimination, intelligence, etc., when ambition was really causing the difference. Therefore, it can be seen that selection arises only when an extraneous variable interferes with the analysis of the relationship between the match and dependent variable. However, in this paper, that relationship is not the direct concern, and on the surface it

would seem as if selection could not be a problem. There is one way in which selection could be affecting the data: that is, the unknown variable which is affecting the income differences between racial groups is also affecting the income differences between birth positions within one racial group. To return to the previous example, it might be that ambition is confounding the relationship between race and income and at the same time confounding the relationship between birth order and income. It becomes obvious, then, that if there is no selection interfering with the analysis of race and income (or between the match and dependent variable), then there is none interfering with birth order and income.¹ However, it could be possible for selection to be operating on the match and dependent variable and still not affect birth order and the dependent variable.

The seriousness of selection is usually determined by the theories held by the researcher or his critic. Obviously, since the extraneous variable is unmeasured and uncontrolled, there is no way (statistically) to determine if it is affecting the match-dependent variable relationship. Before beginning research, the researcher attempts to discern and control any variables which might interfere with his analysis. This is what was done in the last chapter when the author discussed the possible effects of father's occupation and family size on the relationship between birth order and the dependent variable. However, in the last analysis, one must proceed at the "pleasure or displeasure of the critics."

¹This does not eliminate the possibility of other types of selection operating on the relationship between birth order and the dependent variable. It simply rules out the possibility of selection due to using a matched sample.

Regression to the mean

Regression to the mean, as in the case of selection, is a problem because it interferes with an analysis of differences between means on the dependent variable. Traditionally, it has been taken to be a function of matching on the basis of extreme scores where there is an imperfect correlation between the matching and dependent variable. However, following the lead of Althauser and Rubin (1970b), regression to the mean will be considered a manifestation of measurement error in the matching variable.

For example, suppose a researcher were interested in the effects of patriotism propaganda campaign on radical college students, and in order to more clearly see the effects of the campaign, he matched the radicals to a group of "silent majority" students on the basis of a measure of alienation. The design of the study also included a post-test on alienation in order to see if the radicals had become any less "anti-establishment." He predicted that, in fact, both groups of students would score less alienated after the campaign than before. However, what he found was that the radical students became more alienated while the others became less alienated. In other words, the campaign had not lessened the distance between the two groups but had widened the gap.

One possible explanation of this finding entails regression to the mean. In finding both a radical and a non-radical student with the same alienation scores, the researcher probably drew his samples from those radicals with above average alienation scores and from those "silent majority" students with below average scores. While some of the students in each group probably were above or below average, most of them, in all likelihood, had had either a good or bad day and had inadvertently scored either high

or low. Therefore, after the campaign, those students who had not scored close to their "true" score would be apt to "regress" back to their average or mean alienation score. This would produce the observed result, regardless of the effects of the campaign. However, if the researcher could be sure that the scores on which he matched were the "true" scores for all students involved (i.e., that there was no error in the measurement of alienation), then the observed widening of the gap between students would reflect the campaign and not how the students felt on the day of the original test.

While this example is simple, it illustrates first, how regression to the mean can interfere with the analysis of differences between two groups and second, how error in measurement of the matching variable can cause this phenomena. One must keep in mind, though, that as in the case of selection, the concern is not with a comparison of means between the two racial groups. Therefore, the question becomes whether matching, which can produce regression between groups, can also produce regression effects within groups. In order to do this it will be assumed, contrary to what is believed to be true, that regression to the mean is a problem with the matched sample of blacks and whites. By attempting to assess the direction of those effects, an attempt will be made to discern if those effects could have any effect on the comparisons of birth order within groups.

To determine the direction of the regression effects, the reader must turn to Table 3 and examine the differences between the population mean on the matching variable and the sample mean for the same variable. Since the sample was matched on both cumulative grade point average and father's occupation, these population and sample means for the integrated whites from

Table 3. Cumulative grade point average and father's occupational prestige for the populations and for the samples from three universities

Institution	Cumulative Grade Point Average	Father's Occupational Prestige
Whites from Integrated University "A"		
Population	2.64 (2420)	46.7 (1779)
Matched Sample	2.64 <u>(125)</u>	29.5 <u>(125)</u>
Difference	0.00	+17.2
Whites from Integrated University "B"		
Population	2.37 (3200)	45.6 (2138)
Matched Sample	2.60 <u>(202)</u>	31.9 <u>(202)</u>
Difference	-0.23	+13.7
Blacks from the Negro University		
Population	2.51 (1638)	35.5 (1433)
Matched Sample	2.66 <u>(232)</u>	27.6 <u>(232)</u>
Difference	-0.15	+ 7.9

University A and from University B and for the black graduates from the Negro university are listed in Table 3. Of course, for the blacks from the integrated universities, there is only one mean since all blacks from the two schools were included in the sample.

Turning first to grade point average, the reader can see that the whites from University B and the blacks from the Negro university were drawn from the lower tails of their respective grade distributions. That is, the white graduates from University B had higher average grades than their white classmates, and the Negro graduates from the black university had slightly higher grades as well. The differences between the population and sample means reflect the oversampling of those graduates in the two groups who had slightly lower averages. This was done in order to find suitable matches for the integrated blacks. In addition, it can be seen that sample grade average for the respondents from University A was the same as the population mean.

For father's occupation, a similar pattern was obtained; all whites plus the blacks from the Negro university were drawn from the lower end of the respective distributions. The whites from the integrated universities had fathers with occupations higher in prestige than the blacks from the same university. Additionally, the blacks from the Negro university also came from families where the head of the household had higher occupations than the blacks from the integrated universities. Therefore, in order to find matches for the integrated blacks, it was necessary to over-sample those graduates from the three schools whose fathers held occupations with below average occupational prestige.

In terms of regression effects, these differences plus the presence of

measurement error would suggest that the incomes and occupations for the white respondents and for the black respondents from the Negro university would "regress upward"; that is, the income and occupation differences between the integrated blacks and whites would be artificially inflated by the effects of regression.

The question still remains as to what effects, if any, this regression would have on the mean differences between birth positions for one racial group. It would be possible for the birth positions to be affected by the presence of measurement error in father's occupation. Suppose that in sampling the white population, the birth orders were differentially selected; perhaps a sample was drawn where the fathers of the middle born children have lower occupational prestige scores than the fathers of the first who were lower than the last, etc. The incomes of those respondents with the lowest occupations would then regress upward farther than the incomes of those respondents whose father's occupations had originally been closer to the population mean. This would tend to decrease the differences between birth positions.

Now that it has been shown that regression to the mean could be affecting the data, it needs to be established whether regression is, in fact, a problem. This will be done in the following way. First, it needs to be established whether there is or is not measurement error in the matching variables. If there is error, one needs to look at the means for the various birth of significance, then one will not need to be concerned with the differences between the birth orders since those differences, if they exist, would represent "true" differences between the birth positions.

The first matching variable is cumulative grade point average which was

chosen as an indicator of the underlying mental and intellectual ability of the respondents. As in the traditional regression to the mean example of IQ scores, grade points would seem to have potentially significant measurement error.

However, the reader must keep in mind that this average is not a single score but is the average of four or more distinct years of mental and intellectual work. While a student may have one or two bad years, it would seem likely that in four years, his grades would be close to a "true" indication of his abilities. At this point it might be argued that grades are not an indicator of mental and intellectual ability. This may be so, but it still says nothing about the amount of measurement error in the measure that was used. The fact remains that whatever it is that grades measure, in four years time, one seems to have measured that fairly accurately. Therefore, cumulative grade point average does not seem to be a likely candidate for regression effects.

Father's occupation was the other matching variable and it seems to possess more potential for error than grades. According to McTavish (1964), coding occupations by the Duncan scale is subject to coding error. However, after the initial coding was completed, 100 (out of 930) of the occupations were recoded by a person not involved with the original process. Differences in the original and second coding were found in only 8% of the cases.

Additionally, regression effects are dependent upon a series of conditions, one of which is that the ratio of the variance of the measurement error in the matching variable to the variance of the matching variable as a whole be small. Althauser and Rubin (1970b) estimates the ratio for this study and found it to be .02. They conclude that this is "obviously too

small to produce a regression effect." Therefore, it can be concluded that, even though a sample is being used that has been matched on father's occupation and grade point average, the author will not worry about regression to the mean due to this matching process.

Attrition

Attrition is concerned with the percentages of cases that are not used after an interview has been obtained. The reason why it is a problem is that if many more people are interviewed than are used in the sample, the sample size will be decreased and the unrepresentative character of the final sample will be increased. This will not hold whether one is analyzing differences between groups or differences within groups. As will be seen in the following discussion, the largest percentages of cases "lost" for any of the three major samples was 17%.

As was mentioned at the beginning of this chapter, the black graduates from the two integrated universities were interviewed first. However, before they could be interviewed they had to be identified and located, a job which did not always prove easy since neither of the universities keep records of the race by their graduates. Since this information was not available from the school records, the graduates were identified from school yearbook pictures. It is possible that as many as 10% of the graduates were missed because of this procedure and while speculation to the contrary is possible, there is no reason to suspect that the graduates who were missed

differed significantly from the others.

Turning to Table 4, the reader can see that interviews were considered with 184 blacks from University A and 302 from University B. Interviews were not sought with about 10% of each group, either because no address could be found for them after checking university files and motor vehicle records or because they lived outside a NORC interviewing area. Therefore, NORC was instructed to obtain interviews with 166 blacks from University A and 271 blacks from University B. Once again, either due to outright refusal or due to bad addresses or because the interviewers were unable to secure an appointment for the interview, not all requested interviews were obtained. Twenty-four percent of the University A blacks were not interviewed while 26% of the interviews with the University B blacks were not procured. This left 127 A blacks and 200 B blacks who were successfully interviewed. However, once the interviews were obtained, attrition did not affect the black samples for all who were interviewed were matched.

The rates for the other three samples are comparable to the rates for the blacks from the integrated universities, with one major exception. Of all the graduates ever considered for interviews from these three schools, a larger percentage from (20 to 30%) were not sought due to bad addresses or to living outside the NORC interviewing area. As in the case of the blacks from the integrated universities, from 24% to 26% of those interviews requested were not obtained. Complete interviews were obtained from 151 whites from University A, 211 whites from University B, and 281 blacks from the Negro university. The highest attrition rate was for the whites from University A where 25 of the 151 or 17% of the interviews were not used in matching. For the other two schools, the rate was well under 10%. This

Table 4. Availability of graduates and their response to interviews by sample

Availability and Response	SAMPLE				Negro Univ. Blacks
	Univ. "A" Blacks	Univ. "B" Blacks	Univ. "A" Whites	Univ. "B" Whites	
Graduates ever considered for interviews	184	302	292	388	489
I. Interviews not sought	18	31	92	90	108
A. No address located	14	26	27	20	51
B. Out of NORC's inter- viewing area	4	5	65	70	57
II. Interviews requested of NORC					
A. Not obtained	166	271	200	298	381
1. Refusals	39	71	49	77	100
2. Bad address, unable to obtain appointment for interview	18	43	17	34	23
	100%	100%	100%	100%	100%
	29%	26%	24%	26%	26%
B. Interviews completed	21	28	32	43	77
1. Interviews matched	127	200	151	221	281
2. Interviews not used in matches (% = II/2)	127	200	126	200	276
	76%	74%	63% ^a	67%	72% ^a
	0	0	25	21	5
	0%	0%	12% ^a	7%	1%
III. Proportion of completed interviews not used in matches (% = B/2)	0	0	25	21	5
	0%	0%	17%	9%	1%

^aRound-off error of 1%.

can be seen from the bottom line of Table 4. Therefore, it can be seen that the attrition rates for four of the samples are extremely low, ranging from 0% to 9%. Further, it seems unlikely that the 17% loss for the fifth sample, the whites from University A, is high enough to render the sample unrepresentative.

The above section has been concerned not only with the attrition rates for the various samples but also with the rates of "lost" or non-respondents, i.e., the number of potential respondents who, for whatever the reason, were not interviewed and matched. The reason for this concern is the same as the reason for the concern for attrition, i.e., sample size and the representativeness of the sample. However, since the non-respondent rate was somewhat higher than the attrition rate, it would be wise to address the discussion to the characteristics of those non-respondents.

Looking first at grade point average (Table 5), it is seen that the non-respondents had higher grades than respondents in every sample, but that the size of the differences never exceed .09 grade points. This does not seem to be a significant difference.

Since the information available from the files of the integrated universities A and B was of poor quality, a comparison is possible of the respondents' and non-respondents' fathers using Census occupation categories only, as can be seen from the bottom of Table 5. The reader can see that the non-respondents came from families where fathers had higher occupational prestige positions. Although a difference of .70 to .90 out of a total of 8.00 points seems like a rather large difference, the reader must keep in mind that Census categories do not necessarily constitute a monotonically increasing ordinal scale of occupational prestige. For example, many craft

Table 5. Mean grade point averages and father's occupation of respondents and non-respondents by sample

Average on Matching Variable	SAMPLE				
	Univ. "A" Blacks	Univ. "B" Blacks	Univ. "A" Whites	Univ. "B" Whites	Negro Univ. Blacks
Grade Point Average (1=A;2=B;3=C;4=D)					
Respondents in matched sample	2.75	2.58	2.64	2.60	2.66
Non-respondents ^a	2.74	2.50	2.57	2.56	2.57
Father's occupation					
Census categories ^b					
Respondents in matched sample	5.41	5.05			
Non-respondents	4.58	4.31			
Duncan's socioeconomic index					
Respondents in matched sample			29.5	31.9	27.6
Non-respondents ^a			26.6	28.9	29.5

^aIncludes potential respondents outside of NORC interviewing areas, respondents with no address available or with bad addresses, respondents refusing to be interviewed, and others.

^bWhere 1 = Professional, technical and kindred workers; 2 = Managers, officials and proprietors; 3 = Sales; 4 = Clerical; 5 = Craftsmen, foremen and kindred workers; 6 = Operatives (semi-skilled); 7 = Service; 8 = Unskilled, farm workers.

occupations (5 on Census category) bring in higher salaries than clerical occupations (4 in Census classification). In other words, it is unclear that a difference of .90 says anything very significant about the relative differences in prestige between two groups.

For the whites and for the blacks from the Negro university, it is easier to make comparisons about their father's occupational prestige since these are coded according to the Duncan scale. It can be seen that the white respondents' father had slightly lower occupational prestige than the respondents' fathers. For the blacks from the Negro University, the opposite holds true. In all cases, the differences do not exceed ± 3.0 prestige points which is not a very large difference. In addition, the figures, both Census and Duncan, for the respondents and non-respondents are not strictly comparable. The figures for the non-respondents represent their fathers' occupations while they were in college while the respondents' figures represent their fathers' lifetime occupation. While the two could be the same, it is not necessarily so. Further, if they were different, one might expect the lifetime occupation to be higher than the occupation at the time the son was in college. This would tend to decrease the distance between the two groups. Whether this is true or not, one can see that the respondents do not differ greatly from the non-respondents.

Quality of matches

The last hazard to matched samples is incomplete matching or the quality of the matches obtained. Obviously, unless one settles for an extremely small sample size, one is not going to be able to find perfect matches for all pairs of respondents. However, the farther one is from obtaining perfect matches, the greater the power of the matching variable to explain differences between match groups on the dependent variable. In this case, quality of the matches is important because the author predicted the same model for both blacks and whites. That is, one expects first born whites

as well as first born blacks to "do better" academically, occupationally and income wise than middle or last born whites or blacks, respectively. This is found not to be the case, and if one has obtained relatively complete matches, then one will have at least eliminated two factors, the father's occupation and grades, as possible sources of variation between the two groups.

While an ideal match was one that paired off graduates with the same father's occupations and grade points, in practice restricted variation was allowed. That is, an "acceptable limit" for father's occupation was defined as ± 16 occupational units while for grade point the limit was $\pm .60$. Since the occupational scale has a range of 96 units while the grading scale has a range of 4.00 units, it is easy to see that wider limits were permitted for grades than for occupational prestige. This was done since it was felt that father's occupation was the more important of the two matching variables. In addition to these two standards, two others were attempted. First, whenever possible, the graduates were matched within the same year of graduation. When this was not possible, they were matched to within two or three years of one another. Lastly, the graduates were matched according to a random procedure described in Althauser and Rubin (1970a).

Turning to Table 6, the reader can see that all four criteria were satisfied about three-fourths of the time. However, none of the criteria, taken singly, was violated more than 12% of the time. For the whites from the integrated university A, it was not possible to stay within the acceptable limits for father's occupation for 12% of the matches. The same was true for year of graduation. While it is important to know how often it was

Table 6. Percentage of matches accomplished in accordance with the procedures of randomization, matching within year of graduation and matching within acceptable limits on father's occupational prestige and grade point average, by sample

	Sample being matched to blacks from integrated Universities "A" and "B"		
	University "A" Whites	University "B" Whites	Negro Univ. Blacks
Percentage matched by all four procedures	74%	77%	80%
Percentage matched within acceptable limits on			
Cumulative average	94	94	94
Father's occupational prestige	88	92	93
Percentage matched within the same year of graduation	88	90	93
Percentage matched by the two rules of randomization	98	93	98

possible to satisfy the above requirements, it is perhaps more important to know how close one came to eliminating differences between the two groups on the matching variables. For that, the reader must turn to Table 7.

Although the proportion of the differences between groups eliminated by matching has been calculated, the resulting figures can be misleading. For example, for the whites from university A, it can be seen that none of the difference between the whites and the blacks on grade point has been eliminated. While this is true, the more important fact is that the difference between the populations was negligible before matching and remained the

Table 7. Mean grade point average and father's occupational prestige for three populations and for all groups in the resulting matched samples of black and white graduates

Matched Sample Groups	A --	Univ. "A" Whites	Univ. "B" Whites	Univ. "A" & "B" Whites
	B --	Univ. "A" Blacks	Univ. "B" Blacks	Negro Univ. Blacks
<u>Mean Grade Point Average (A=1; B=2; C=3; D=4)</u>				
Estimated mean of all graduates in group A		2.64	2.37	2.49
		.00	-.23	-.13
Sample mean in group A		2.64 -.03	2.60 -.25	2.62 -.11
		-.03	-.02	+.02
Sample mean in group B		2.67	2.62	2.60
<u>Proportion of difference eliminated in matching</u>				
		0% (of -.03)	92% (of -.25)	118% (of -.11)
<u>Mean Father's Occupational Prestige (Duncan socioeconomic index)</u>				
Estimated mean of all graduates in group A		46.7	45.6	56.1
		17.2	13.7	15.3
Sample mean in group A		29.5 22.9	31.9 17.5	30.8 18.5
		5.6	3.7	3.2
Sample mean in group B		23.9	28.2	27.6
<u>Proportion of difference eliminated in matching</u>				
		75% (of 22.9)	78% (of 17.5)	83% (of 18.5)

same after matching. Therefore, while the percentages are useful as guides, the reader would do better to look at the absolute differences remaining after matching.

It can be seen that virtually all differences in grades have been eliminated by the matching process. The largest original difference of $-.25$ points between the whites from university B and the blacks from the same university has been reduced through matching to $-.02$ points. None of the other blacks in the matched sample differ from their matches by more than $\pm .03$ points.

For father's occupation, although the proportion of the difference eliminated is smaller than for grades, the absolute differences between the blacks and the whites are still small. The largest remaining difference is for the whites from university A whose fathers, after matching, still have 5.6 units higher prestige than the blacks from the same school. However, even this difference is not large on a scale that has a range of 96 points. For the other two samples, the differences are under 4 units of prestige. However, it should be noted that it is the whites and the Negroes from the Negro university whose fathers have the higher prestige.

Summary

This section has discussed the four hazards to matched sampling paying close attention to the potential effects they have, both on the analysis of differences between groups and on the differences within groups using a matched sample. It has been shown that matching, which can give rise to four hazards to the analysis of a dependent variable between two groups, can also produce the same types of hazards for analysis within one of the

groups. However, this is the case only if the hazard is present in the analysis between the two groups. Furthermore, in the cases of selection and regression to the mean it was shown that the presence of these hazards did not necessarily mean that they would affect our analysis.

One saw that selection became a problem when there were extraneous variables which interfered with the interpretation of differences between the means for the dependent variables. More importantly, one saw that the presence or absence of selection effects depended on the strength of one's theory.

Regression to the mean becomes a problem when there is excess measurement error in the matching variables. It was attempted to show that the error in the measurement of father's occupation and cumulative grade point average was negligible.

Next, an attempt was made to show that the attrition rates for the three samples was low enough so as not to warrant concern about either sample size or the unrepresentativeness of the final samples. Finally, the quality of the matches was discussed and it was seen that the absolute differences remaining between the matched groups was small.

Now that the problems in analysis that can arise as a result of matched sampling have been discussed, the problems that may arise out of using a sample, matched or not should be considered.

Representativeness

One problem that any researcher encounters when he uses a sample of a total population is whether, for whatever the reason, those persons whom he has not included in the sample (the non-respondents) are in any way differ-

ent than those he has included (the respondents). When one is using a random sample, the ideal is to draw a sample which is in all respects a microcosm of the larger population. The ideal is the same for a matched sample except that the researcher makes an overt attempt to alter the composition of the sample on the matching variables only. In both cases, differences between the two groups, the parent population and the sample, should be noted and account taken of the possible impact of these differences on the subsequent analysis.

Ideally, in a study of birth order differences, one would like to know that the composition, by birth position, of the sample is the same as the larger population. Additionally, one would like some assurance that the various first borns, last borns, etc., chosen for the sample are similar to the first, last and middle borns who were not chosen. Since this sample was not chosen with a study of birth order in mind, this information is not available. However, it is known how the sample differs with respect to the matching variables, father's occupation and cumulative grade point average. By examining these differences the reader may be able to get an idea of how, if at all, they will affect our analysis.

Returning to Table 3, one can see the estimated grade point averages and father's occupational prestige scores for the population as compared to the samples. One sees that the mean for the sample for both grades and father's occupation is lower than the mean for the population. The only exception is for the whites from university A whose mean grade point equals the mean grade point of all whites from that university. Further, unlike the differences between the respondents and non-respondents, these differences are large enough that one must take into account how they affect birth

order differences.

For both grades and father's occupation, in order to match the whites and the blacks from the Negro university to the blacks from the integrated universities, the sample has drawn respondents from the lower end of the respective distributions. This means that for the whites and for the blacks from the Negro university, the sample may have underrepresented only and first borns and overrepresented the other two birth positions.

Recalling Schachter's (1963) work on the Minneapolis high school students, he found evidence that first borns have higher grades than later borns. This would mean that later borns would tend to be found in the lower portion of the grade distribution, which is where we have oversampled. However, this would not be true for the blacks from the integrated universities since the sample is, for all practical purposes, the total population of blacks from those two schools.

Father's occupation would tend to have the same type of effects. There is reason to believe that the higher the father's occupation, the greater the emphasis put on college education. Further, one might expect first and only borns to internalize parental goals more than later borns. Therefore, from the lower occupational prestige families, one would expect more later borns going to college not only due to the above reasoning but also due to family size. That is, the lower occupational prestige families would tend to have larger families, thereby producing more middle borns to go to college. Once again this would hold true for the whites more than for the blacks since the blacks from the integrated universities do not differ from the populations of blacks within those schools.

A problem which is intricately tied to the representativeness of a

sample is the problem of the generalizability of that sample. That is, in a descriptive study, one hopes to be able to generalize his findings to some larger population and in order to do that, one draws a sample which resembles the larger population in all important respects -- one that is representative of the larger population. It has been shown that the blacks from the integrated universities are representative of the population of blacks from those two schools because they are the population. However, for the whites and for the blacks from the predominately black university, the sample overrepresents those graduates with lower grade points and those graduates with father's with lower prestige occupations. Further it is expected that this overrepresentation will manifest itself in fewer first and only born respondents than one would find in a completely random sample, but one did not find reason to expect the first and only borns included in the sample to differ significantly on the dependent variables from the first and only borns not in the sample.

This means that the results will not apply to all first borns, last borns, etc. First, the study is restricted to the study of college graduates. In a moment the consequences of that limitation will be discussed. Second, one can generalize only to those graduates from universities similar to the three in our study. In addition to similar academic standards, this means that they should be located in an urban area and should all be located in approximately the same area of the country.

Therefore, as the analysis of the data begins one should remember that all results, even if not explicitly stated, should be understood on these terms. For example, when one is speaking of first borns, one is speaking of first born college graduates from urban Eastern universities.

Selection of College Graduates

There is one other major methodological problem that must be dealt with. That is, since the study deals with respondents who are all college graduates, the author must consider the effects of this level of education on the kinds of respondents that are in the sample. In order to graduate from college, each of these respondents must have passed through several educational "hurdles" -- high school graduation, college entrance and finally college graduation. At each stage, black and white students alike face possible disqualification due to below average ability, disadvantaged backgrounds, and possibly, if the theory is correct, birth position. As a result, as will be shown, academic ability, family background and birth order will have less affect on post-college success than in a general population.

The effects will be considered of each of these factors, academic ability, family background and birth order, at each successive stage of the educational process. One may safely assume that students with lesser academic ability, and poorer family backgrounds will have less of a chance of graduating from high school than those from average or above average ability and background. Additionally, one would expect that fewer later borns than first borns would graduate from high school. Some later borns and students from lower backgrounds and poorer abilities will graduate, but more will not. This is the first hurdle.

The second obstacle to college graduation is college entrance. One might expect the same type of selection process to operate. That is, fewer students with below average abilities and from below average backgrounds will go to college. One would also expect fewer later borns to go to college than first borns. These same processes would operate a third time for

college graduation. Therefore, in a sample of college graduates one would expect to find persons with average or above average abilities, from higher socio-economic backgrounds, and also expect more of them to be first born. This does not seem too surprising. However, as yet one has not considered the persons from the below average ability and from the below average background and the later borns who, in the face of three hurdles, did make it past high school, into college and finally graduate from college. One might suppose that these persons will in some way be special. That is, in order to compensate for ability, background or birth position, these persons must be endowed with above average motivation, persistence, patience, etc. In other words, they will be different from those who were left behind at each stage. What effect will this have on the analysis?

For a moment, consider only the later borns. Obviously, if the later born has had to compensate for his birth position, this compensation will make him more similar to the first born than the later born who did not graduate from college. In addition, because the later born is somehow special, we might expect that he will have "pulled farther ahead" of the later born who did not go to college than the first born in college "pulled ahead" of the first born not in college.

This compensation process will cause similar results for those students from below average backgrounds and abilities. Once in college and successfully graduating from college, they will resemble those persons from above average backgrounds and abilities more than they will resemble the ones left behind.

As yet one has not considered the effects of race on this process. It is generally accepted that blacks will have less of a chance of graduating

from high school, once graduated from entering and subsequently from graduating from college. Therefore, those who do enter and graduate from college are probably from above average ability, background and are predominately first born. In fact, one might expect a larger proportion of first borns among the blacks than among the white respondents. However, because the selection process is more severe for blacks than for whites, one would expect the differences between the blacks of various abilities and backgrounds and birth positions to be smaller than for whites. In other words, concerning post-college success, one would expect to find a more homogeneous group among the blacks than among the whites, regardless of background, ability or birth position.

Therefore, it can be seen that this selection process slightly alters some of the predictions made in Chapter 3. In Chapter 3, it was predicted that both black and white first borns would be "more successful" in post-college careers than later borns. Additionally, one expected to find more first borns in college than later borns. The reader may expect to find these things. However, one may expect to find proportionately more first borns among the blacks than among the whites. In addition, the reader might expect the differences between the black birth orders to be smaller than among the white birth positions. Turning to an analysis of the data will allow the reader to see if selection has in fact altered the hypotheses.

CHAPTER V. ANALYSIS

In this chapter, the hypotheses concerning birth order which were developed in Chapter 3 will be tested. That test will consist of several parts. First, the zero order relationships between birth order and the various dependent variables will be examined. This will be done by looking at the means, and where means are not applicable, the percentage distribution of the dependent variables within the birth order categories. Second, still looking at the means and percentage distributions, tests for interactions between background factors such as family size and father's occupation and the birth order-dependent variable relationship will be made. Of course, up to this point birth order will have been considered primarily as an isolated variable within the social setting. Therefore, the last and most important part of the analysis will consist of looking at birth order as it affects the dependent variables, taking into account all the other variables which were included in the model developed in Chapter 3. This will allow the reader not only to see the relative strengths of the path coefficients, but also how much more has been explained by looking at birth order in addition to other variables. Of course, as a by-product of this type of analysis, the reader will be able to see the effects of other variables on the dependent variables. This will be of interest if for some reason it is found that the hypotheses do not hold and birth order is not important.

Statement of Hypotheses

Each hypothesis will undergo two different modes of analysis as previously mentioned. Since the second mode involves a consideration of all relevant variables on the dependent variable and not solely birth order,

the author feels that it will make better sense to the reader if the chapter is organized around the modes of analysis rather than around a separate discussion of each hypothesis. In other words, the discussion of any one hypothesis will not appear in one section but will appear in two or more parts. Then, at the end of the entire discussion, conclusions about each separate hypothesis will be drawn.

Therefore, each hypothesis will first be listed as it appears theoretically and as it will be tested empirically. The ensuing discussion will then center first around the descriptive data and then around the regression analysis. The chapter will end by restating the hypotheses and drawing conclusions about each.

Educational hypotheses

The first two hypotheses concerned the education of the first born or only born as compared to the later borns. The first stated that:

Hypothesis 1: There will be a greater proportion of first borns involved in and completing a given level of education the higher that level of education.

This first hypothesis becomes two testable statements when it is made empirical:

- 1a. There will be a larger proportion of only and first borns in college as opposed to middle and last borns.
- 1b. Further, the only and first borns will have completed more years of education than the middle and last borns.

The second, which posited interaction between the relationship between birth order and education stated that:

Hypothesis 2: First borns, relative to later borns from the same class, will strive to be involved in and complete more education the higher the social class of origin.

In empirical form, this also becomes two statements.

- 2a. There will be a larger proportion of first and only borns in college relative to later borns, the higher the occupational prestige of the respondent's father.
- 2b. The difference in the years of education completed by first and only borns as opposed to later borns will be greatest for those respondents from families with fathers with the highest occupational prestige and least for those respondents from families with the lowest occupational prestige ratings.

Education-related hypotheses

The next four hypotheses dealt with scholastic achievement, activities and finances of the first borns as compared to later born respondents.

Hypothesis 3: First borns will have higher scholastic achievement than later borns.

Hypothesis 4: First borns will be less active in extra-curricular activities than later borns.

Hypothesis 5: First borns will be financed in school by their parents more often than later borns.

Hypothesis 6: Persons who are financed in school by their parents will be involved in and complete more education than persons who are not financed by their parents.

Relating these hypotheses to the specific study and the specific sample, they become:

3. First and only borns will have higher grade point averages in college than later borns.
4. First and only borns will have a lower activity score for extra-curricular activities in college than later borns.
5. First and only borns will have been financed in college by their parents more often than later borns.
- 6a. There will be a larger proportion of respondents in college who have been financed by their parents.
- 6b. Further, the respondents who have been financed by their parents will have completed more years of education than respondents who were not financed by their parents.

Income and occupation hypotheses

In much the same vein as was seen for the education hypotheses, it was predicted that the first birth positions would have an advantage in their occupations and incomes. Theoretically, it was predicted that:

Hypothesis 7: First borns will be in higher prestige occupations than later borns.

Although this hypothesis is almost in empirical form, it becomes:

7. First and only borns will have significantly higher occupational prestige scores than later borns.

In addition, it was suspected that there would be interaction between the birth order-occupation relationship and family size.

Hypothesis 8: First borns from large families will have lower prestige occupations than later borns from large families while first borns from families of other sizes will have higher prestige

occupations than later borns from the same family size.

Empirically, this becomes

8. First borns from large families will have significantly lower occupational prestige scores than later borns from large families while first borns from families of other sizes will have significantly higher occupational prestige scores than later borns from the same family size.

Concerning income, it was theoretically predicted that:

Hypothesis 9: First borns will have higher incomes than later borns.

Empirically, this becomes:

9. First and only borns will have significantly higher incomes than later borns.

The last hypothesis was concerned with the racial group identification of the respondent. For lack of reason to believe otherwise, it was predicted that:

Hypothesis 10: The same differences between first and later borns will hold for blacks as for whites.

In empirical form, this states:

10. The above stated hypotheses will hold for black respondents as well as for white respondents.

In order to test the ten hypotheses, the author will begin with a discussion of the mean differences between birth positions on the dependent variables. The reader should keep in mind that conclusions about the validity of the hypotheses will be withheld until the end of the chapter or until both types of analysis have been discussed.

Success Factors: Preliminary Analysis

For a number of reasons which were enumerated in Chapter 3, it will be expected that the first born is more "successful" than the later born respondents. The indicators of success which will be considered are 1) graduate education and 2) education-related variables, i.e., grades, activities and finances, 3) post-education "success" variables, i.e., income and occupation.

Education

From Chapter 3, the first prediction which was made concerning birth order was that first born children will do better educationally than later born children. Since the sample contains only college graduates, one will expect to find proportionately more first borns in the sample than later borns. This is, of course, based on the premise that first borns will be "selected-out" from the potential population of college students to attend college in greater numbers than one might expect by chance alone. Additionally, it might be expected that first borns who have graduated from college will be more apt to continue their education than later borns. In other words, one would expect first borns to have completed more years of education than later borns. In order to test the first interpretation, one should look at the distribution of birth positions in the college population. In the latter one should look at the mean years of education completed by the birth positions.

Distribution by birth position Turning to Table 8, it can be seen that 47% of the whites and 38% of the blacks were either only children or

Table 8. Distribution of black and white respondents in four birth positions

	Only	First	Middle	Last
Blacks	13% (80)	25% (153)	36% (220)	25% (151)
White	15 (48)	32 (104)	19 (61)	35 (113)
Total	14 (128)	28 (257)	30 (281)	28 (264)

first born.¹ Reviewing Table 2 in Chapter 2, one sees that the proportion of first and only born whites falls between the proportions for the students from Queens College (46.7%) and the University of Minnesota (50.3%) while the blacks are closer in distribution to the Minnesota High School students (35.2%). The whites in the sample, therefore, seem to be slightly over-represented in the first two birth positions. However, the blacks, compared to the studies from Chapter 2, are more nearly distributed in a way which suggests that no selection of first or only children has taken place.

Turning from a comparison of these respondents with the studies in

¹In Chapter 3, birth order was considered to consist of two categories: first borns, including first and only borns; and later borns, including all other positions. These are the categories on which the predictions were made. However, Table 8 and all subsequent tables (excluding those dealing with family size) are broken into four birth positions: only children; first borns; middle born children; and last born children. The reason for this is that with four categories it is possible to collapse and get the original two categories. However, if only two categories are used, information is being lost. If it turns out that the first and only borns "behave" in the same way and the middle born and last born also "behave" similarly, then the categories can be collapsed. If this is not the case, as has been suggested in some of the literature, then we will come out knowing more than we started out knowing.

Table 9. Percent distribution of black and white respondents in three birth positions for different family sizes

	Family Size							
	Three		Four		Five		Six-Eight	
	Blacks	Whites	Blacks	Whites	Blacks	Whites	Blacks	Whites
First	36% (33)	38% (28)	31% (28)	27% (11)	18% (12)	11% (2)	13% (20)	4% (1)
Middle	37 (34)	22 (16)	46 (42)	44 (18)	64 (42)	50 (9)	68 (102)	64 (18)
Last	27 (25)	41 (30)	23 (21)	24 (12)	18 (12)	39 (7)	19 (28)	32 (9)

Chapter 2 to a comparison of these respondents to one another, it is seen that for the blacks there are proportionately more black middle borns (36% for blacks; 19% for whites) and proportionately fewer first borns (25% for blacks; 32% for whites), although both blacks and whites have about equal proportions of only borns (13% to 15%). One additional comparison between blacks and whites can be made: there is a 10 percentage point difference in the proportions of white and black last borns in favor of the white respondents.

These differences between blacks and whites could be due to two different phenomena. First, the excess of middle borns over the other birth positions for blacks could be a simple manifestation of family size; with larger families, there are more middle born children in the population and therefore, more middle borns in college. Looking at the bottom of Tables 10a and 10b, one can see that the average number of siblings for blacks is 2.9 while for whites it is 1.9. Therefore, there is reason to believe that the differing distributions are due to family size.

Table 10a. Statistical profile for black respondents (N = 604)

Means	No. of sibs.	Dad's occu.	Ac- tivity score	Years of educ.	Grade point	Resp. occu.	Income 1966	Age in 1966
1. Only (80)	0.0	33.2	4.3	17.2	2.636	71.7	12,772	42.3
2. First (153)	2.5	26.6	4.1	17.3	2.658	73.3	10,889	39.1
3. Middle (220)	4.5	25.4	3.6	17.1	2.616	71.3	11,358	41.4
4. Last (151)	2.6	24.9	3.8	17.2	2.646	73.0	11,360	40.4
Totals	2.9	26.6	3.9	17.2	2.637	72.3	11,425	40.7

Table 10b. Statistical profile for white respondents (N = 326)

Means	No. of sibs.	Dad's occu.	Ac- tivity score	Years of educ.	Grade point	Resp. occu.	Income 1966	Age in 1970
1. Only	0.0	36.0	2.6	16.8	2.557	69.4	12,043	37.7
2. First	1.6	31.6	2.0	16.8	2.604	72.5	12,962	40.9
3. Middle	3.8	29.9	1.9	16.4	2.624	72.0	14,339	42.6
4. Last	2.1	29.7	1.6	16.5	2.564	73.6	12,330	40.5
Totals	1.9	31.3	1.9	16.6	2.587	72.5	12,860	40.6

However, there could also be a second type of phenomena taking place: perhaps different types of self-selection into college operate for blacks and whites. The reader will recall from Chapters 2 and 3 that many researchers considered the overrepresentation of first and only born children

to be due to some type of selection; that is, for either economic or social reasons, the first born has an advantage when it comes to academic matters. Perhaps for blacks, the middle borns instead of the first borns are the beneficiaries of this selection process. It has already been shown that family size seems to have an effect. However, whether family size is the only factor operating can be best ferreted out by holding family size constant in order to see if the birth order differences persist.

Turning to Table 9, we see that except for possibly the three child family, the differences in the proportions of middle borns for blacks and whites virtually disappear. (Since the total number of whites coming from five children families is so small, one cannot place a great deal of confidence in the 14 percentage point difference between blacks and whites for this family size.) For the three child family, the reader can see that there are proportionately more middle born blacks and proportionately more last born whites. Since this trend obtains for only one family size, it probably is indicative of sampling fluctuations rather than a differing selection process for blacks and whites. Perhaps more important for the test of the hypothesis is whether an excess of first borns among whites, regardless of family size, continues to obtain. By looking at Table 9 it can be seen that this is not the case. The reader can see that as family size increases, the proportion of first borns decreases; the largest percentage is for the three child family where one finds 38% first borns. Therefore, the first finding and the one which was not expected is that neither for blacks nor for whites is there an overrepresentation of first borns, before and after family size is taken into account.

Years of education by birth position The possible reasons for the above finding will be discussed later. However, the fact that there was not an overrepresentation says nothing about the potential success of those first borns in the sample. Therefore, the next step in the test of the education hypothesis will be to look at the mean years of education completed by each of the four birth positions.

Turning to Tables 10a and 10b and looking at the column labeled years of education, the reader can see that there is no difference in the years of education completed by the birth positions for either the black or white respondents. Therefore, no matter whether the concern is the proportions of first borns in the sample or the amount of education completed by those first borns, the first hypothesis concerning education does not hold.

Interaction of father's occupation with birth order Recalling Chapter 3 once more, the possible effects of socio-economic class on the values internalized by the first borns and the amount of education completed by them were discussed. From this discussion a second hypothesis was obtained which stated that first borns will be more concerned with securing an education the higher the socio-economic class of origin. If this is true, then it is possible that there is an overrepresentation of first borns from high socio-economic backgrounds and an underrepresentation of first borns from low socio-economic background, resulting in an approximately normal distribution in the entire population. The same type of phenomena could be at work in masking differences in the years of education completed. Empirically, then, one would hope to find 1) a larger proportion of first borns among the respondents from a high background (measured by father's occupational prestige on the Duncan scale) and 2) greater mean years of education

completed by those first borns from the higher prestige background.

By looking at Table 11, one sees that the proportion of respondents in each of the four birth positions differs very little depending on the prestige level of the father's occupation. In addition, from Table 12 it can be seen that there is no difference in the mean years of education completed by respondent's from different backgrounds. One can conclude that regardless of father's occupational prestige, there is no difference in the mean years of education completed or in the proportions of respondent's attending college for the various birth orders.

Interaction of family size with birth order There is one other possibility which could be obscuring the birth order effects. From Tables 10a and 10b, one can see that for both blacks and whites the middle child comes from a larger family than either the first or last born. Of course, this comes as no surprise since to be either first or last born requires having only one sibling while to qualify for middle child status requires at least two siblings. The point is not that middle children come from larger families; rather the point is that perhaps the first born children who were reported to excel educationally (from Chapter 2) did so because they came from smaller families. It has already been shown in Table 9 that the proportions of first born whites in the sample seem to be attributable to family size; however, it has not yet been determined whether first borns from small families complete more years of education than other birth positions in the same family size.

Turning to Tables 13a and 13b one sees that controlling for family size does not produce any great differences between birth positions. For the blacks, regardless of family size, there is always less than one year

Table 11. Distribution of black and white respondents in four birth positions by father's occupational prestige level

Father's Occu- pation	Blacks		Whites	
	Low 29 or less %	High 30 or more %	Low 29 or less %	High 30 or more %
Only	11	17	13	17
First	26	24	31	33
Middle	37	35	18	19
Last	25	24	38	31
TOTALS	100 (367)	100 (237)	100 (168)	100 (158)

Table 12. Average years of education for blacks and whites within groupings of father's occupation and birth position

Father's Occu- pation	Blacks			Whites		
	Low	High	Totals	Low	High	Totals
Only	17.3 (40)	17.1 (40)	17.2 (80)	16.9 (21)	16.8 (27)	16.8 (48)
First	17.4 (97)	17.2 (56)	17.3 (153)	16.8 (52)	16.8 (52)	16.8 (104)
Middle	17.2 (137)	17.0 (83)	17.1 (220)	16.6 (31)	16.4 (30)	16.5 (61)
Last	17.1 (93)	17.3 (58)	17.2 (151)	16.4 (64)	16.7 (49)	16.5 (113)
TOTALS	17.2 (367)	17.1 (237)	17.2 (604)	16.6 (168)	16.7 (158)	16.6 (326)

Table 13a. Average years of education for black respondents by family size

Family Size	One	Two	Three	Four	Five +
Only	17.2 (80)				
First		17.6 (70)	17.5 (33)	17.0 (28)	17.0 (32)
Middle			18.0 (34)	17.1 (42)	16.9 (144)
Last		17.5 (65)	17.0 (25)	16.8 (21)	17.0 (40)
TOTAL	17.2 (80)	17.6 (125)	17.5 (92)	17.0 (91)	17.0 (216)

Table 13b. Average years of education for white respondents by family size

Family Size	One	Two	Three	Four	Five +
Only	16.8 (48)				
First		16.8 (62)	16.5 (28)	17.5 (11)	16.0 (3)
Middle			16.9 (16)	16.6 (18)	16.1 (27)
Last		16.5 (55)	16.1 (30)	17.0 (12)	16.7 (16)
TOTAL	16.8 (48)	16.7 (117)	16.5 (74)	17.0 (41)	16.3 (46)

of education difference between the birth positions. The same holds true for the white respondents. In addition, the differences that do occur do not follow any sort of coherent pattern but are distributed rather randomly among the birth positions.

Looking instead at the differences between family sizes, one does see a pattern emerging for the blacks, although not for the whites. For blacks, excepting the only child, it seems that the respondents from smaller families have completed more education than those from large families. However, it should be kept in mind that the differences between the family sizes are not very great. The largest is for the middle child; the middle born black from a three child family has one year more education than the middle born black from a five child or larger size family.

In summary, it can be said that even after controlling for family size, there is no difference in the amount of education completed by the birth positions for either blacks or whites. However, for blacks there does seem to be differences between family sizes, with the smaller families having an educational advantage over the larger families. Even between family sizes, though, the differences in years of education completed are not very great.

Summary In Chapter 3 two predictions were made about the first born and education. The first was that more first borns would be in and complete a given level of education the higher that level of education. The second was that first borns from higher socio-economic backgrounds would put more emphasis on education than those first borns from lower socio-economic backgrounds. However, it has been shown that neither of these hypotheses have been upheld by our data; after family size is taken into account, neither the black nor the white samples from either a high or low socio-economic

background contains an overrepresentation of first borns. In addition, there is no difference in the number of years of education completed by first, only, middle or last borns, regardless of either father's occupational prestige or size of the respondent's family.

The only educational differences which do occur are due to family size. For blacks, there is a trend for the respondents from the smaller families to have slightly more education than those respondents from larger families. However, the trend does not hold for whites.

Education-related variables

In Chapter 3 three other variables were also discussed which were related to education. Predictions about two of these, grade point average and college activities were made on the basis of the socio-psychological model and predictions about the third, finances, were based on the economic model. It was predicted that the first born would have higher grades than the other birth positions, would be less active in extra-curricular activities and would be supported more often by his parents than the others. This section will be concerned with testing these predictions.

Cumulative grade point average Looking at the columns labeled grade point in Tables 10a and 10b, one sees that the first born does not have higher grades than the other birth positions. In fact, there is no difference between the only, first, middle or last born respondents in the grades they earned in college. What Schachter (1963) found to be true among the Minneapolis high school students does not hold among a matched sample of black and white college graduates.

Extra-curricular activities Contrary to what was predicted, one finds that the only born child seems to be more active in extra-curricular activities. For blacks, both the only born and the first born seem to have been slightly more active than the other two birth positions. However, for the whites, it is solely the only born who was more active in college; there is a greater difference in the activity score between the white only born and the other birth positions and the black only born and the other birth positions.

Finances The third education related variable was based on the economic model which states that the first born will have first access to family finances and will therefore be more able (financially) to go to college. Empirically, then, one would expect to find that the first born's education was paid for by his parents more often than is true for later borns. Turning to Table 14, one sees that the prediction is partially supported. For blacks, the middle born has been supported less often by his parents than for any other birth position. The only, first and last born have been supported by their parents about equally. However, all black respondents have been supported in college by other means more often than they have been supported by parents.

For whites, one sees similar trends. The only and first born whites have been supported by their parents more often than either the middle or last born. Once again the reader sees that all white respondents have depended on their parents less often than they have depended on other means.

Summary As was the case with the education of first borns, the hypotheses concerning education-related variables have not been supported. First, it was shown that grade point average was not at all affected by

Table 14. Frequencies of blacks and whites within birth positions who were financed in college by parents or other means

Finances	Blacks				Whites			
	Parents %	Other %	No answer %	N	Parents %	Other %	No answer %	N
Only	38.8	60.0	1.3	80	35.4	64.6	0.0	48
First	31.4	68.0	0.7	153	30.8	67.3	1.9	104
Middle	15.0	84.1	0.9	220	19.7	78.7	1.6	61
Last	35.1	64.9	0.0	151	21.2	78.8	0.0	113

birth order. Second, the only born, contrary to what was predicted, was more active extra-curricularly than the others. As predicted, however, one saw that the only and first born, for both blacks and whites, were among the siblings most often supported in college by their parents. Nevertheless, in all cases the respondents looked to other means more often than they looked to their parents.

Post-education variables

In 1967 Blau and Duncan commented on the occupational and income advantages for the first born. From the theoretical framework it was predicted that the first born would have an advantage in these areas. This section will be concerned with a test of those predictions. In addition to looking at the zero order relationship between occupation and birth order and income and birth order, a check will be made to see if there is any interaction between the occupation, income and birth order relationships and father's occupational prestige.

Respondent's occupation Turning to Tables 10a and 10b, one sees that birth order does not make a great deal of difference in the prestige levels of the black and white respondents. For blacks, there are small differences (about two points) with the first and last born having slightly higher occupational levels than the middle or only born. For whites, the last born seems to have the higher prestige level; in particular, the greatest difference (4.2 points) is between the last and only born white. With a scale that has a range of 96 points, four points is not very large a difference. This is illustrated by looking at some occupations with their ratings: a designer or a stocks and bonds salesman is rated 73; a teacher is rated 72; a traffic manager in the transportation industry is rated 71; finally, both a salaried manager in an apparel and accessories store and a radio operator are rated 69. Therefore, one can conclude that for both blacks and whites, the small (four points or less) differences which exist between birth positions are probably not significant.

Income Income does seem to be affected by birth order, although in different ways for blacks and whites. From Table 10a the reader sees that the black only born has a higher income than any of the other black respondents. Contrary to what was expected, the black first born had the lowest income of all. For the whites, there is little difference in the income levels between the only, first and last borns. However, the middle born white has an almost \$2,000 dollar advantage over the others.

Father's occupation and respondent's occupation Turning to Table 15, it can be seen that considering father's occupational prestige does not noticeably change the occupational differences which were noticed before. In fact, for the blacks, the minor advantage which was noted for the first

Table 15. Average respondent's occupation (Duncan) for blacks and whites within groupings of father's occupation and birth position

Father's Occu- pation	Blacks			Whites		
	Low	High	Totals	Low	High	Totals
Only	72.2 (40)	71.1 (40)	71.7 (80)	67.8 (21)	70.7 (27)	69.4 (48)
First	73.6 (95)	72.6 (55)	73.3 (150)	72.6 (51)	72.4 (52)	72.5 (103)
Middle	71.0 (133)	71.8 (82)	71.3 (215)	71.8 (31)	74.0 (30)	72.9 (61)
Last	73.1 (91)	72.8 (57)	73.0 (148)	74.0 (63)	72.6 (48)	72.5 (111)
TOTALS	72.4 (359)	72.1 (234)	72.3 (593)	72.4 (166)	72.6 (157)	72.5 (323)

and last borns over the others becomes even less minor, particularly among those blacks whose father's had high occupations. For whites, the advantage of the last born over the only born is increased for the respondents from the low (less than 29 points on the Duncan scale) occupational backgrounds and is diminished for those from the higher backgrounds.

Father's occupation and respondent's income For the blacks (see Table 16) controlling for father's occupation reveals no new insights into the income differences between birth positions. The advantage of the only born is accentuated for the black respondents from a low background and diminished for the only born from a high background. Looking at the column totals, however, one sees that father's occupation taken by itself makes little difference in income for the respondents. That is, the black respondents from a low background differ little from those respondents from a high

Table 16. Average income in 1966 for blacks and whites within groupings of father's occupations and birth positions

Father's Occu- pation	Blacks			Whites		
	Low ^a	High	Totals	Low	High	Totals
Only	11,151 (40)	11,923 (39)	12,772 (79)	13,667 (21)	10,731 (26)	12,043 (47)
First	10,691 (97)	11,232 (56)	10,889 (153)	12,115 (52)	13,808 (52)	12,961 (104)
Middle	10,904 (136)	12,110 (82)	11,358 (218)	13,903 (31)	14,821 (28)	14,339 (59)
Last	10,935 (92)	12,034 (58)	11,360 (150)	12,873 (63)	11,633 (49)	12,330 (112)
TOTALS	11,151 (365)	11,851 (235)	11,425 (600)	12,928 (167)	12,787 (155)	12,860 (322)

^aA low occupation was one that fell between 0 and 29 on the Duncan scale, and a high occupation was any above 30 on the Duncan scale.

background.

Up to this point it has been shown that controlling for father's occupation has made little difference, but when it has, the effects have shown up for those respondents from a low prestige background. However, for whites, this pattern is different than before. The income advantage for the middle born white which the reader saw before father's occupation was controlled is accentuated for the middle born respondent from a high background and diminished for the middle born from the low background. Originally the middle born had the greatest advantage over the only born, since the middle born earned on the average over \$2,296 more per year than the only born. However, the middle born from a low background earns only \$236

more than the only born from the same prestige level, while this difference jumps to \$4,070 for the middle born from a high prestige background. In addition, the first born from a high background also seems to have an income advantage (of \$3,077) over the only born; previously the difference in incomes between the first and only born was only \$918.

To summarize, for both blacks and whites, father's occupation interacts more with the relationship between birth order and income than with the relationship between birth order and respondent's occupation, although in neither case does the interaction seem to be very great. For blacks, neither birth order nor father's occupation nor the interaction of the two affect respondent's occupation. Income is affected by both birth order and also by the interaction of birth order and father's occupation; an only born black, regardless of father's occupation, earns approximately \$1,500 more than any other black. However, when an only born black comes from a family where his father had a Duncan rating of less than 29, he will earn about \$2,700 more than the other blacks and the only born from a family where the father had a higher prestige rating will earn no more or no less than any other black from a high background.

Among the whites, both occupation and income are affected by both birth order and the interaction of birth order and father's occupation. The white only born had a lower occupational rating than the other whites and coming from a family where the father had a low rating depressed the only born's rating by more than a point. This low rating did not seem to translate directly into income differences because the only born white, while lowest of all the whites, did not differ in income from the first and last borns but did earn \$2,000 less than the middle born. When the only born

came from a high background, this difference was almost doubled and the only born who came from a low background, contrary to what we would expect based on occupational ratings, had an annual income almost commensurate with the middle born.

Family size and respondent's occupation Recalling Chapter 3, it was predicted that the later birth positions from large families would have higher occupations and higher incomes than the first borns from families of the same size -- perhaps a compensation for a not so favorable beginning (many siblings). Looking at Table 17a the reader can see that for the blacks within the various family sizes, there is virtually no differences. However, for the whole sample (Table 17b), the middle born from a three child family and the last born from a two child family seem to have higher occupations than the other birth positions within the same family size. Therefore, the reader sees that for whites, the later born does have a higher occupational rating than the first born, but only in the smallest family to which he could belong, and not the largest as we predicted.

Family size, as noticed by Blau and Duncan (1967) does seem to affect occupation. For both blacks and whites, the respondents from the two child family have higher occupations than the other respondents. However, for the whites, the high occupational prestige of the two child family is possibly a reflection of the exceedingly high prestige (77.4) of the last born within that family size. For blacks, no such interaction of birth order with the relationship of family size and incomes seems to be operating.

Family size and respondent's income Once again it was expected that the later borns from large families will earn more than the first born from large families while the first borns from the small families will have the

Table 17a. Average occupational prestige level (Duncan scale) for black respondents by family size

Family Size	One	Two	Three	Four	Five +
Only	71.7 (80)				
First		76.8 (59)	72.0 (31)	68.0 (28)	72.6 (32)
Middle			73.5 (34)	72.5 (42)	70.4 (139)
Last		76.3 (63)	71.0 (25)	68.9 (21)	71.7 (39)
TOTALS	71.7 (80)	76.5 (122)	72.3 (90)	70.3 (91)	70.9 (210)

Table 17b. Average occupational prestige level (Duncan scale) for white respondents by family size

Family Size	One	Two	Three	Four	Five +
Only	69.5 (48)				
First		73.7 (61)	70.4 (28)	72.0 (11)	69.7 (3)
Middle			76.9 (16)	70.9 (18)	71.7 (27)
Last		77.4 (54)	68.2 (30)	74.8 (11)	69.9 (16)
TOTALS	69.5 (48)	75.4 (115)	70.9 (74)	72.3 (40)	71.0 (46)

advantage over the later borns from the same family size. Turning first to Table 18b it is seen that for the white respondents the opposite is true. In the two child family, the last born earns in excess of \$2,000 more than the first born. However, for all larger family sizes the last born earns \$2,000 or more less than the first born. In addition, for families with four or more children, the middle born also earns slightly over \$2,000 more than the last born, and differs from the first born in income very little.

For blacks (Table 18a) birth order seems to affect income very little, regardless of family size. The only exception is the middle born from the three child family who earns \$2,637 more than the first born and \$1,568 more than the last born. However, looking at the column totals, the reader sees that the number of siblings does affect income in the way in which Blau and Duncan (1967) noticed: there is an inverse relationship between family size and income. However, the predicted interactions do not hold for black respondents.

Summary In this summmary, two questions will be asked: first, were the predictions upheld? If not, did other patterns emerge or does it appear that birth order as a predictor is not important? Second, since two success variables have been dealt with one will want to see if there is correspondence between the occupational differences and the income differences. Since two distinct subsamples have been discussed, each will be summarized separately.

Black respondents Before controlling for either father's occupation or family size, it was shown that birth order did not affect the respondent's occupation in any significant way but did affect income, with the only born earning more and the first born earning less. While this

Table 18a. Average income in 1966 for black respondents by family size

Family Size	One	Two	Three	Four	Five +
Only	12,772 (79)				
First		12,000 (60)	9,848 (33)	10,000 (28)	10,646 (32)
Middle			12,485 (33)	11,415 (41)	11,083 (144)
Last		12,646 (65)	10,917 (24)	9,952 (21)	10,275 (40)
TOTALS	12,772 (79)	12,336 (125)	11,110 (90)	10,633 (90)	10,870 (216)

Table 18b. Average income in 1966 for white respondents by family size

Family Size	One	Two	Three	Four	Five +
Only	12,043 (47)				
First		11,387 (62)	15,607 (28)	14,364 (11)	15,667 (3)
Middle			12,750 (16)	15,882 (17)	14,308 (26)
Last		13,691 (55)	10,100 (30)	12,167 (12)	11,933 (15)
TOTALS	12,043 (47)	12,470 (117)	12,757 (74)	14,350 (40)	13,591 (44)

suggests that the income differences are not mere reflections of occupational differences, it does raise the question as to why birth order would affect one variable and not the other. This question remains pertinent, since even after controlling for father's occupation and family size, one finds that birth order does not have any effect on occupation but does affect income. After controlling for father's occupation, it was seen that the only child from a low occupational background is the one who has the income advantage; there is no such advantage for the only born from a high occupational background. The only child retains this income advantage even after controlling for family size, with the exception that the respondents from the two child family have higher occupational ratings than any of the other respondents. There is also no correspondence between the observed income advantage of the middle born from the three child family and the observed occupational prestige of this respondent.

One sees, therefore, that the correspondence between occupational and income effects is not high, and that for the most part none of the predictions held. The only born black does earn more money than the other birth positions even after controlling for father's occupation and family size, but the first born, whom one would also expect to be more successful, has neither a comparatively higher occupational prestige or a higher income.

Before it can be concluded that the income advantage of the only child is due to birth order, other characteristics of the only child which could account for this benefit should be investigated. Turning once again to Table 10a, one sees that on the average, the fathers of the only borns had higher prestige ratings than the fathers of the other birth positions. In addition, the only born is from one to three years older than the other

birth positions.

When controlling for father's occupation, the reader saw that the only borns from the families with prestige rating of less than 29 were the ones who had the income advantage, so the higher occupational prestige of the only borns' fathers would not account for the income differences between the only born and the others. In fact, if anything, this discrepancy would suggest that the fathers of the only borns were not able to pass on their prestige benefits to their sons in terms of dollars.

Age seems to be one possible explanation of this difference. In addition, it would explain the discrepancy between occupational prestige and income. For example, suppose that both the only born and the last born both decided to become dentists. Regardless of how long they had been working at their profession, they would both have identical prestige ratings. The only born, having had the opportunity to build up his practice two years longer than the last born could easily be earning over \$1,000 more than the last born.

By comparing the top half of Table 19 with the income figures in Table 18a, one sees that there seems to be a correspondence between the age of the respondent and his income with the older respondents earning more money than the younger ones. There is only one discrepancy for the blacks and that is the last born from the four child family who equals the only born in age but earns considerably less. This seems to be the only exception for the black sample. The fact that the agreement is high between age and income should make the reader leary about attributing the income differences to birth order alone.

Table 19. Average age of black and white respondents by family size

Family Size		One	Two	Three	Four	Five +
BLACKS	Only	42.4				
	First		39.8	36.4	38.5	40.9
	Middle			41.3	40.3	41.8
	Last		40.7	38.2	42.3	40.2
	Only	37.7				
WHITES	First		37.6	45.8	45.5	46.3
	Middle			39.3	43.2	44.1
	Last		38.3	42.2	41.7	43.6
	Only					

White respondents As with the black respondents, one saw that income is affected by birth order more than is occupation, and that there seems to be poor correspondence between income and occupation. One saw that the last born white had a higher occupational prestige but that the middle born was the one who earned more. In addition, the last born in families with fathers having low as opposed to high prestige were also the last borns with high prestige, thereby suggesting that the last borns did not inherit their occupational prestige rating from their fathers.

One also saw that the middle born from both low and high occupational backgrounds have higher incomes than the others within that group but that the differences for the middle born from a low background ranged from a low of \$236 (middle born - only born incomes) to a high of \$1,778 (middle born - first born incomes). For the middle born from the high occupational pres-

tige background, however, the differences ranged from \$1,013 (middle - first) to \$4,090 (middle - only). Two interesting facts emerge from this analysis. First, the income differences between the respondents from the low background are not very great compared to the differences found in the high income background. Second, there is a complete reversal of the pattern of income differences between the two prestige groupings. The first born who has the lowest income in the low grouping has the second highest in the high grouping. There is one last point to be made concerning father's occupation, respondent's occupation, and income. The lack of agreement that we noticed before controlling still persists. That is, the last borns' occupational prestige advantage does not seem to be translatable into income advantages.

After family size is taken into account there is some correspondence between occupation and income; the last born from the two child family has the high occupational prestige for that family and also has the high income. However, for the respondents from families of three or more children, there is no such agreement. In fact, none of the birth positions seem to have an advantage over any others. However, the first and middle borns seem to be earning more money than the last born within the respective family sizes. Lastly, it was shown that contrary to Blau and Duncan's finding concerning family size, income increases as family size increases.

Although the patterns are not as clear as for the blacks, the last born white seems to have a higher occupational prestige and that the middle and first born whites have higher incomes than the other birth positions.

Turning to Table 10b, age once again seems to be a relevant explanatory variable. The middle born is the oldest and the only born is the youngest

with the first and last born falling in between. Comparing Table 19 with the income figures in Table 18b and the occupational ratings in Table 17b, there is even closer agreement between age and income for whites than was seen for blacks. Almost without exception, the older the respondent, regardless of birth position, the higher the income. However, age does not seem to explain the differences in occupational prestige. The older respondents do not have higher ratings, and the last born from the two child family, who has the high rating, is one of the youngest of the white respondents.

Summary: preliminary analysis

In this section the author has been looking at the data descriptively in order to see if there are any differences between the various birth positions on several success and success related variables and if those differences followed the predicted patterns. It was found that neither the black nor the white sample contained an overrepresentation of any one birth position. Additionally, there were no differences in the number of years of education completed by the first, only, middle or last borns. For blacks, there did seem to be educational differences due to family size, with the blacks from the smaller families completing more education than those from larger families. Two of the education related variables did seem to be affected by birth order. The only born, contrary to what was predicted, was more active than the other birth positions. However, it was shown that the only and first borns from both samples were among the ones most often supported in college by their parents. Although this prediction concerning means of finance seems to hold true, the one concerning grade point did not since grades in college were unaffected by birth order.

For the other two success variables, income and occupation, the predictions did not hold. For both blacks and whites, it was shown that birth order does not affect occupation as much as it affects income. However, on closer examination, it seemed as if most of the income differences were attributable to age differences rather than to birth order. Age does not account for the few occupational differences we noticed for the whites; that is, the last born, not the first as predicted, was more "successful" occupationally.

This descriptive look at the data seems to suggest that birth order does not produce many differences between respondents on the various success variables but does produce differences on success related variables, specifically, activities and finances. In addition, the reader has seen that variables other than birth order, i.e., age and family size, may be equally important as predictors. Therefore, in the next section one will be interested in considering the effects of other variables on the dependent success in order to determine how important birth order is in relationship to the others.

Success Factors: Regression Analysis

In this section one will be interested in answering two questions. First, by knowing a respondent's birth order, is a significantly greater amount known (in terms of explained variance) about the dependent variables of education, occupation, and income than if there was no knowledge of his birth order? Second, what other variables, in addition to or in place of birth order, are important in predicting respondent's success? The first task will be accomplished through an analysis of the coefficients of

multiple determination obtained through multiple regression analysis using a mixed model of dummy variables and continuous independent variables. Subsequently, the path coefficients obtained from the multiple regression will also be used.

This analysis differs from Blau and Duncan's (1967) in that they did not actually estimate coefficients for birth order. However, by using dummy variables, the author was able to do so. In general, to construct dummy variables, each class of a variable is made into a separate independent variable. For birth order, a separate dummy variable was set up for each position. For example, if the dummy variable B_{1i} represents the first birth position of the i th graduate then B_{1i} is coded 1 if the respondent is first born and 0 if he is not. Only three variables were constructed for the four birth positions, for if any respondent is 1 on any of the three, he is 0 on the fourth. Put another way, the last category does not need to be included since its values are determined by the categories prior to it.

In order to illustrate the use of the dummy variables and also the means for calculating the coefficients, the author will use the shortest equation taken from the predicted model. In this case, means of finance will be predicted. Letting means of finance = F and father's occupation = D ,

$$F_i = a + bD_i + e_i \quad (1)$$

where e_i is an error term with mean zero which represents the difference between the true value of F and the value predicted for F by the model. In this case, means of finance is also a dummy variable where

$$F_i = \begin{cases} 1 & \text{financed by parents} \\ 0 & \text{financed by other means} \end{cases}$$

This equation calculates the net effect of father's occupation on son's means of finance in college without considering the birth position of the son.

In order to determine birth order effects, three variables need to be added to equation (1):

$$B_1 = \begin{cases} 1 & \text{first born} \\ 0 & \text{other born} \end{cases}$$

$$B_2 = \begin{cases} 1 & \text{only born} \\ 0 & \text{other born} \end{cases}$$

$$B_3 = \begin{cases} 1 & \text{last born} \\ 0 & \text{other born} \end{cases}$$

The equation then becomes

$$F_i = a + bD_i + \sum c_j B_{ji} + e_i' \quad (2)$$

where B_j represents membership in a particular birth position j , e_i' is the error term for the model and c_j is the regression coefficient for each dummy variable B_j . The c_j for the excluded category (middle borns) is obtained by a simple calculation noted below. For example, in the case of the first born, $B_{1i} = 1$ and $F_i = (a + c_1) + bD_i$. For the middle born (the excluded category), $F_i = a + bD_i$. This means that the value of the implied coefficient is equal to the constant term or the "a" for the regression. Furthermore, it means that the value of the coefficient for the middle born forms a "base line" and that the coefficients for the other dummy variables are all either increments or decrements from this value (Lane, 1968, p. 743).

Birth order effects

By obtaining results for both equation (1) and (2), and all subsequent equations both with and without birth order variables, it can be determined

if the explained sums of squares from the second equation is significantly larger than the sums from the first equation. If there is a significant difference then one can conclude that knowing birth order does give an advantage over not knowing birth order.

Tables 20a and 20b show the coefficients of multiple determination for each of the six regression equations indicated in the predicted model in Chapter 3. The coefficient has been obtained for the equation both with and without birth order variables. Subsequently, an F-test was calculated which evaluates the improved sums of squares for the model containing birth order relative to the model which did not contain birth order. The ratio

$$\frac{R_1^2 - R_w^2}{1 - R_1^2} \cdot \frac{N - r - 1}{r - s}$$

is distributed with $N - r - 1$ degrees of freedom in the denominator and $r - s$ degrees of freedom in the numerator where R_1^2 is the coefficient of multiple determination for the regression including birth order and R_w^2 is the coefficient for the regression without birth order; N is the number of observations, r is the total number of independent variables used to estimate R_1^2 , and s is the number of independent variables added to estimate R_1^2 over those used to estimate R_w^2 . The calculated values of F enables the author to assess the significance of the improvement in the explained sums of squares of the larger model relative to the unexplained sums of squares, $1 - R_1^2$ in the smaller model. If the values of F are significant at a given level, it will be assumed that this difference is not due to sampling error (Lane, 1968, p. 744).

Turning to Tables 20a for blacks and 20b for whites, the reader sees

Table 20a. Coefficients of multiple determination (R^2) for selected regressions with and without birth order variables for blacks

Dependent Variables	R^2					
	Income	Respondents	Educa-	Cumulative	Activity	Finance
	Occupation	Occupation	tion	average		
Without birth order variables (# indep.)	.1873 (6)	.2283 (5)	.0496 (4)	.0202 (3)	.0361 (2)	.0167 (1)
With birth order variables (# indep.)	.1957 (9)	.2305 (8)	.0510 (7)	.0216 (6)	.0392 (5)	.0597 (4)
Number of cases	545	545	545	545	545	564
F - Test						
Increment due to birth order	1.827	.5178	.2640	.2511	.5778	8.386

Table 20b. Coefficients of multiple determination (R^2) for selected regressions with and without birth order variables for whites

Dependent Variables	R^2					
	Income	Respondents	Educa-	Cumulative	Activity	Finance
	Occupation	Occupation	tion	average		
Without birth order variables (# indep.)	.0954 (6)	.1515 (5)	.0777 (4)	.0238 (3)	.0091 (2)	.0246 (1)
With birth order variables (# indep.)	.1059 (9)	.1630 (8)	.0809 (7)	.0292 (6)	.0229 (5)	.0396 (4)
Number of cases	309	310	310	310	310	310
F - Test						
Increment due to birth order	1.171	1.494	.3505	.4680	1.423	1.591

that knowing the respondent's birth order does not significantly improve his knowledge of the explained sums of squares, except in the case of means of finance for blacks. In this latter case, knowing birth order adds more than 4% to the explained sums of squares over that which was explained only knowing father's occupation.

The significance of this finding in light of the descriptive study in the first part of the chapter is that even though there may be mean differences between birth positions on several of the dependent variables, those differences are really not significant when compared to differences which may arise from other sources. In fact, if the author were to apply other appropriate significance tests she may well come up with significant differences between selected birth order coefficients. However, if knowing birth order as a whole does not add an increment significantly different from zero, then the specific differences between birth order coefficients are not important.

Returning to the one significant finding, knowledge that birth order improves the variation in means of finance says nothing about how birth order operates. For that one must turn to Figure 5 in which the regression coefficients are listed. The reader should consider the unstandardized coefficients since there is no way of estimating a standardized coefficient for the middle born. Looking at the coefficients, one sees that all birth positions affect means of finance positively but that the coefficient for the middle born is smaller than for the other positions. However, it becomes difficult to put an interpretation of those coefficients since the dependent variable, means of finance is also dichotomous.

Johnston (1963, p. 228) discusses a method whereby these coefficients

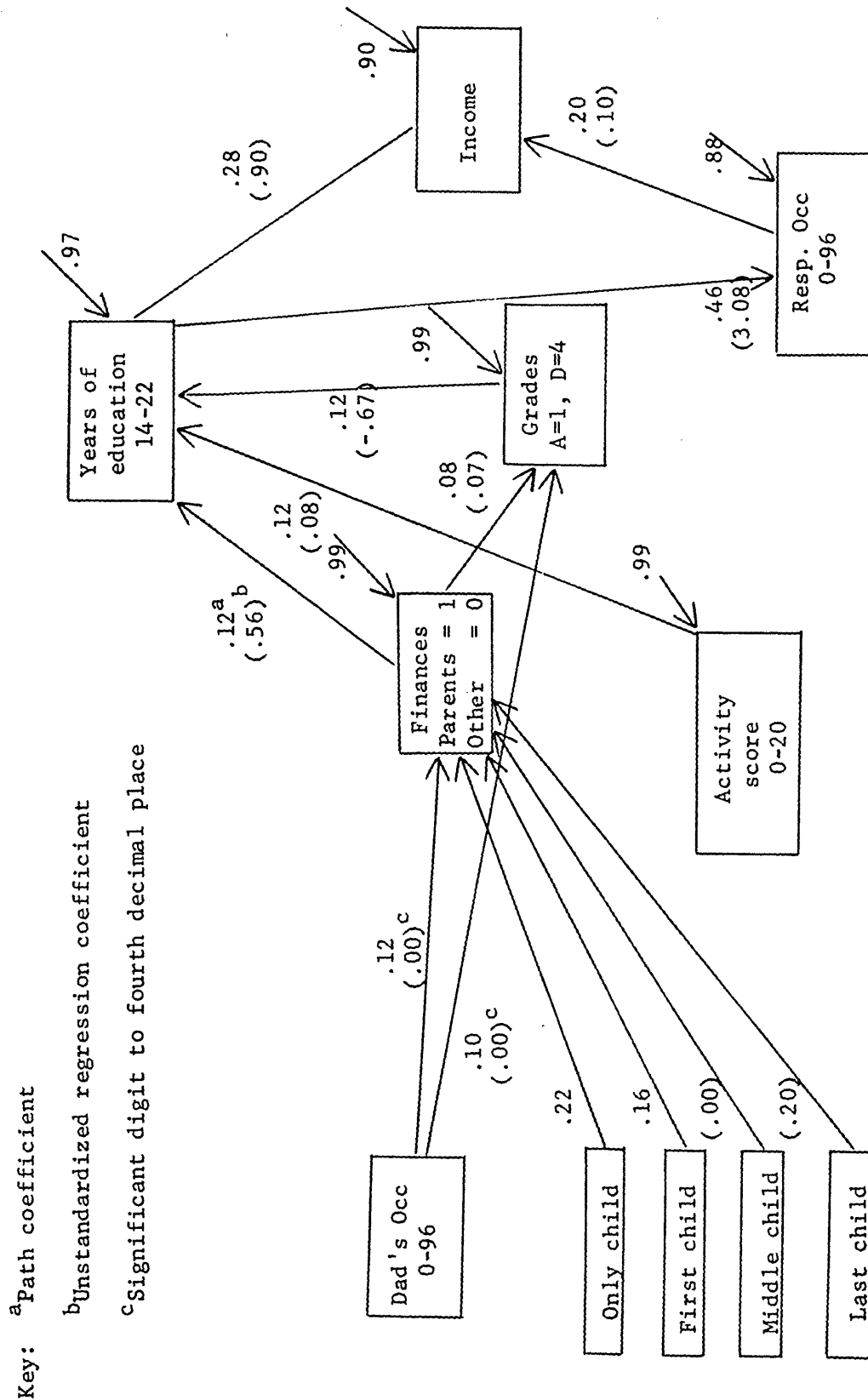


Figure 5. Effects of birth order, activities, grades, and finances on years of education, respondent's occupation and respondent's income for black respondents

can be translated into probabilities of being financed by one's parents.

The probabilities would be calculated from the equation:

$$P(F_p) \text{ or } P(\text{financing by parents}) = .163 + B_{1.1}$$

where

$$\begin{aligned} B_{1.1} &= 0.000 \text{ for middle born} \\ &0.201 \text{ for last born} \\ &0.219 \text{ for only born} \\ &0.161 \text{ for first born} \end{aligned}$$

The resulting probabilities would then be:

$$\begin{aligned} P(F_p/\text{middle}) &= .16 \\ P(F_p/\text{last}) &= .36 \\ P(F_p/\text{only}) &= .38 \\ P(F_p/\text{first}) &= .32 \end{aligned}$$

The reader can see therefore, that the probability of being financed in college by parents is not high for any of the birth positions. However, the middle born has less of a chance than any of the others. In fact, the probabilities are very close to the distributions that were seen in Table 14 where about 30% of the first, only and last borns were being financed by their parents while only about 15% of the middle borns were.

The question remains as to the significance of this finding for the economic hypothesis. Assume for the sake of discussion that the probabilities of being financed by parents are directly translatable into the probabilities of going to college. (In fact, the economic hypothesis does make this assumption.) Further, assume that there are 100 potential college goers for each birth position. Based on the above probabilities, therefore, one would find in college 16 middle borns, 36 last borns, 38 only borns and 32 first borns. Combining categories as was done in the studies from Chapter 2 (i.e., first and only vs. other born) and figuring the percentages in

college based on these categories, one sees that 62.5% of the college students would be either only or first born as opposed to 37.5% being other born. Even if one were more realistic and did not assume equal numbers for each birth position, it does seem as if economics could account for the overrepresentation of first and only borns in Schachter's and other samples. A better test, however, would be to look at the distribution of birth positions in college without combining categories to see if there are more last borns compared to the middle borns. This is not true for this sample and it is not ascertainable for the samples discussed in Chapter 2.

For the sample of black respondents, one has seen that ease of financing in college does not translate into "success" in later life. That is, the experience of not having to worry as much as the middle born about money seems to neither hinder nor help the first and last born after college.

Therefore, at least for this sample of black and white college graduates, birth order does not seem to be an important predictor of success in later life. In the first part of the chapter, one saw that there were few consistent differences between the birth positions. However, even those differences become insignificant once other variables were taken into account. Perhaps by looking at those other variables to see how they affect the "success" of the respondents the reader can get a better understanding of why birth order is not important.

Other effects

Turning to Figures 5 and 6, the reader can see that except for two differences, the models for blacks and whites are identical: for blacks, birth order does not affect income and they have no such effect for blacks.

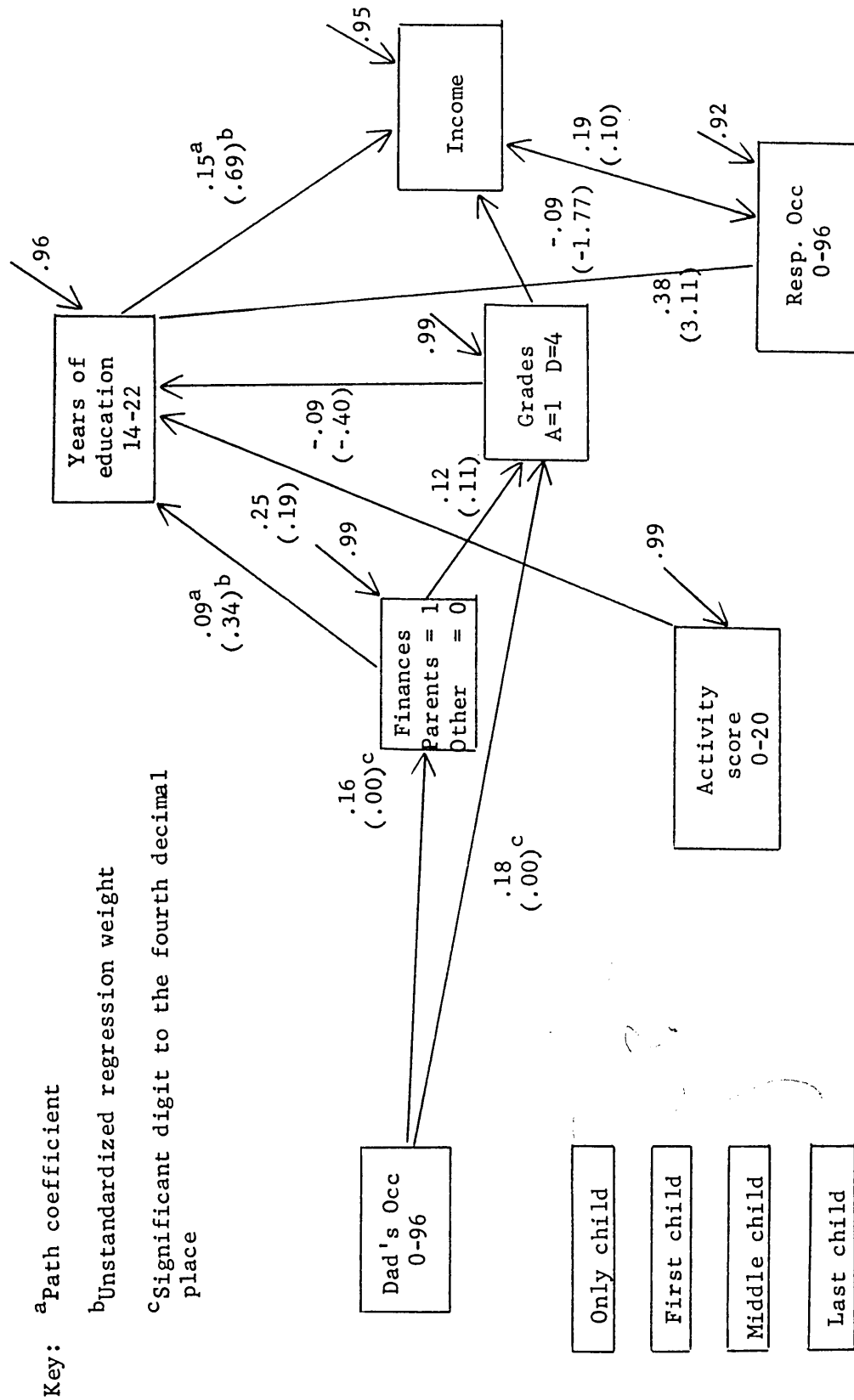


Figure 6. Effects of birth order, activities, grades and finances on years of education, respondent's occupation and respondent's income for white respondents

We predicted the same models for both blacks and whites, and although the models we ended up with are not identical to the ones we predicted, they are nearly identical for the two races.

In the discussion that follows, each dependent variable will be discussed separately in the same way that each was discussed in the first part of the chapter.

Education First looking at Figure 5 for blacks and Figure 6 for whites, one sees that the same three variables, means of finance, activity score and grades, all affect years of education. For the blacks, they all affect education equally since all have a path coefficient of .12.¹ For the whites, activity score has close to three times the effect of the other two variables. However, none of the coefficients are very strong for either black or white. Looking at the unexplained sums of squares, one can see that for blacks, 5% ($1 - .95$) of the variance has been explained; for whites, that figure is 8% ($1 - .92$).

This becomes even more clear when looking at the differences between blacks and whites on any one variable. For example, a change of one grade (a change from a B average to an A average, for example) produces a change

¹According to Snedecor and Cochran (1967, p. 382), B_i (the partial regression coefficient) measures the "average or expected change in Y when X_1 increases by one unit, X_2 remaining unchanged." This means that our unstandardized coefficients are "in natural unit" terms and are best used in comparisons when natural units will not confuse our interpretation. Therefore, when we want to compare between samples on the same variable, when we want to know the effect of X on Y for both blacks and whites, we will use the unstandardized coefficient. However, when we want to know the relative importance of different X variables on the same or different Y's within the same sample, we will use the standard partial regression coefficients since these have been corrected for scale. These coefficients then estimate the change in Y, as a fraction of σ_y , produced by one S.D. change in X_i .

of .67 or two-thirds of a year for blacks and less than half a year change for whites (.40).¹ By looking at the other unstandardized coefficients, it can be seen that a change of one unit in either finances or activities produces significantly less than a year of education change. Not only are these changes fairly small but both blacks and whites produce about the same amount of change.

Although one might expect father's occupation to affect education, one saw in the first part of the chapter that controlling for father's occupation made no difference in the years of education completed by the different birth orders nor were there differences between the respondents from the different occupational backgrounds. Therefore, it should come as no surprise to the reader to find in both Figures 5 and 6 that father's occupation does not affect years of education directly. Of course, for both samples, there are indirect effects but they are all small and inconsequential. The indirect path through means of finance is .01 for both blacks and whites (.12 x .12 for blacks; .16 x .09 for whites); for the path through grades is .01 for blacks (.10 x .12) and .02 for whites (.18 x .19). There is also a possible path through both means of finance and grades but the resulting coefficients are even smaller than the previous ones. One can conclude, therefore, both by looking at the mean differences in years of education between father's occupational groupings and by looking at the indirect paths, that father's occupation has a negligible effect on son's education.

¹Although there is a negative coefficient between grades and education, there is a positive relationship. This is due to the coding of grades where the higher the grade, the lower the number. In order to avoid confusion, we will report the coefficients without a sign since a negative sign is usually associated with a negative relationship.

In the same way, one can calculate the indirect effects of birth order on education for the black sample. By multiplying the path coefficients, the resulting paths are .02 for the only, first and last borns and .00 for the middle born. As in the case of father's occupation, these effects are not strong enough to be considered significant.

Education related variables For both blacks and whites: 1) the activity score is unaffected by anything in the model; 2) means of finance is affected by father's occupation such that the higher the father's occupation, the higher the probability of being financed in college by parents; 3) grades are affected in college both by means of finance and father's occupation. Furthermore, both affect grades negatively. That is, the higher the father's occupation, the lower the grades in college; those being financed by their parents tend to have lower grades than those not being financed by their parents. These two relationships suggest two things. First, at least as far as grades are concerned, coming from a higher occupational background is no asset. Second, taking into account 2 and 3 above and also taking into account the relationships discussed for education, it is seen that father's occupation, weak as the relationship is, affects education positively through means of finance but negatively through grades. Stated another way, the higher the father's occupation, the greater the education completed, taking into account means of financing in college. However, taking grades into account, the higher the father's occupation, the lower the years of education completed. 4) Finances are affected by birth order for the black sample only, with the middle born having the lowest probability of having his education paid for by his parents.

Respondent's occupation For both blacks and whites, the only variable which is directly affecting occupation is education and for both samples a change in one year of education produces a change of three points on the Duncan scale. Translated into real occupations, this is a change from a radio operator (69) to a teacher (72). It could also mean the difference between a self-employed manager in a motor vehicle and accessories retailing store (70) and a stocks and bonds salesman (73).

The black and white samples differ, however, in the indirect effects on occupation. For the whites, there is only one effect of any importance; the coefficient for the effect of activities through education is .10. For the blacks, means of finance, activities and grades all affect respondent's occupation through education and for each the coefficient is .06. Therefore, for whites, occupation is affected directly by education and indirectly by education and indirectly (and not as strongly) by activities. For blacks, the same strong, direct effect of education on occupation prevails along with three fairly weak, indirect effects.

As was seen in the case of education, and also as was seen when father's occupation was controlled, the respondent's occupational background has no direct effect on son's occupation. The indirect effects of father's occupation, either through finances, grades or some combination are too weak to be of consequence.

Income For both blacks and whites, income is positively affected by respondent's occupation and respondent's education. Also, for whites, the higher the grades in college, the higher the income in later life. However, the effects of grades on income is about half as strong as the effects of either education or occupation (-.09 compared with .15 and .19). None-

theless, looking at the unstandardized coefficient, one sees that a change in one grade point, or a change from a B to an A average, increases income by \$1,770.¹ For blacks, of course, a similar change would produce no income change.

For both blacks and whites, a change of one point on the Duncan scale would produce a \$100 change in income. Theoretically, this means that the stocks and bonds salesman would be making on the average \$300 more per year than the manager of the auto store. However, the reader can also see that education is "worth more" to the black man than to the white. For whites, one year of education would be worth \$690 while for blacks that same year of education would be worth \$900.

As we saw for the other two "success" variables, father's occupation has no direct effect on respondent's income. Additionally, neither that variable nor any other has substantial indirect effect on income.

Summary

This chapter has attempted, through both descriptive data and regression analysis, to cull the effects of birth order on the three "success" variables (education, occupation and income) and also on three education related variables (means of finances, extra-curricular activities, and grades in college). More importantly, an attempt has been made to see if the birth order effects were the ones predicted in Chapter 3.

The first finding, and one which sets this study off from most other birth order studies, concerns the first two hypotheses. These hypotheses,

¹A coefficient of 1.00 is equal to \$1,000.

stated in both theoretical and empirical form, are as follows:

Hypothesis 1: There will be a greater proportion of first borns involved in and completing a given level of education the higher that level of education.

Hypothesis 2: First borns, relative to later borns from the same class, will strive to be involved in and complete more education the higher the social class of origin.

Empirically, each became two testable statements.

1a. There will be a larger proportion of only and first borns in college as opposed to middle and last borns.

1b. Further, the only and first borns will have completed more years of education than the middle and last borns.

2a. There will be a larger proportion of first and only borns in college relative to later borns, the higher the occupational prestige of the respondent's father.

2b. The difference in the years of education completed by first and only borns as opposed to later borns will be greatest for those respondents from families with fathers with the highest occupational prestige and least for those respondents from families with the lowest occupational prestige.

Concerning hypotheses 1a and 2a, it was shown that neither the black nor the white sample contained an overrepresentation of first and only born children once family size was taken into account. Furthermore, this obtained regardless of the occupational prestige of the respondent's father. The second finding, also the opposite of what was reported in the literature was that there is no difference for either the blacks or the whites in the

mean years of education completed by different birth orders. This finding obtained even after taking father's occupation into account. These findings were confirmed by the regression analysis where the reader saw that knowing birth order did not significantly improve the explained sums of squares.

It can be concluded, therefore, that:

Conclusion 1: Neither Hypothesis 1 nor Hypothesis 2 has been supported by the data.

Conclusions about the education-related variables were not so clear-cut, however. The third hypothesis, which stated

Hypothesis 3: First borns will have higher grade points than later borns.

3. First and only borns will have higher grade point averages in college than later borns.

This hypothesis was clearly not confirmed by the data. Neither through regression analysis nor through descriptive data did birth order make any difference in the grade point averages of the respondents. The second conclusion, therefore, is that

Conclusion 2: Hypothesis 3 has not been supported by the data.

However, concerning the next two hypotheses, the conclusion was not as easily arrived at. Hypothesis 4 stated that:

Hypothesis 4: First borns will be less active in extra-curricular activities than later borns.

4. First and only borns will have a lower activity score for extra-curricular activities in college than later borns.

Contrary to what was predicted, it was seen that when the descriptive data was looked at that the only born, both black and white was more active than the other birth positions. However, the analysis of the explained sums of

squares indicated that birth order was not a significant predictor of college activities. This does not rule out the only born being more active. It simply indicates that given the total scheme of things, variables other than birth order are more important in explaining who will participate in college activities. It may be concluded, therefore,

Conclusion 3: Hypothesis 4 has not been supported by the data.

The next two hypotheses concerned means of financing. Stated in both theoretical and empirical form, they are:

Hypothesis 5: First borns will be financed in college by their parents more often than later borns.

Hypothesis 6: Persons who are financed in school by their parents will be involved in more education than persons who are not financed by their parents.

5. First and only borns will have been financed in college by their parents more often than later borns.

6. There will be a larger proportion of respondents in college who have been financed by their parents.

As predicted, it was shown that the first and only borns seem to be financed in college more often than the middle borns. What was not predicted was that the last born would also be financed in college more often than the middle born. This relationship (of first, only and last borns being financed more often than middle borns) was stronger for blacks than for whites. However, concerning Hypothesis 6, the reader saw that less than 40% of all respondents, regardless of race, relied on their parents to finance their college education. These findings obtained when regression analysis was looked at. For the blacks, knowing birth order significantly improved the

explained sums of squares. In addition, the calculated indicated that the probability of being financed in college by parents was less than .40 for all birth positions but that the middle born had a significantly lower chance than the others. Therefore, concerning Hypotheses 5 and 6, it may be said that:

Conclusion 4: If last borns are included along with first and only borns, then Hypothesis 5 has been supported by the data for the black respondents but not by the data for the white respondents.

Conclusion 5: Hypothesis 6 was not supported by the data.

Turning to the hypotheses dealing with the respondent's occupation, the reader saw once again that birth order was not a good predictor. The expectations were that:

Hypothesis 7: First borns will be in higher prestige occupations than later borns.

Hypothesis 8: First borns from large families will have lower prestige occupations than later borns from large families while first borns from families of other sizes will have higher prestige occupations than later borns from the same family size.

7. First and only borns will have significantly higher occupational prestige scores than later borns.

8. First borns from large families will have significantly lower occupational prestige scores than later borns from large families while first borns from families of other sizes will have significantly higher occupational prestige scores than later borns from the same family size.

It was seen that there were no differences in the mean occupational prestige scores of the respondents from the different birth orders, regardless of either father's occupation or family size. Furthermore, this finding obtained for the regression analysis. It may be concluded that:

Conclusion 7: Hypotheses 7 and 8 have not been supported by the data.

From an analysis of the descriptive data, there did seem to be income differences between the birth positions. It was expected that:

Hypothesis 9: First borns will have higher incomes than later borns.

9. First and only borns will have significantly higher incomes than later borns.

It was seen that for blacks, the only born earned over \$1,000 more than the other black respondents. For whites, it was the middle born who had more than a \$1,000 advantage, but after controlling for father's occupation and family size, the first born white seemed to be earning more than either the only or last born white. On closer inspection, however, it seemed as if age might be responsible for the income differences for both blacks and whites.

That birth order was not primarily responsible for the income differences was seen when the regression analysis was looked at. For neither blacks nor whites did birth order contribute a significant amount to the explained sums of squares. Therefore, concerning income and birth order, it may be concluded that:

Conclusion 8: Hypothesis 9 was not supported by the data.

The last hypothesis concerned the significance of these hypotheses among black and white respondents. It was predicted:

Hypothesis 10: The same differences between first and later borns will

hold for blacks as for whites.

10. The above stated hypotheses will hold for black respondents as well as for white respondents.

Contrary to what was predicted, it has been shown that the hypotheses, except for number 5, have held for neither blacks nor whites. The one hypothesis that was supported held only for the black respondents. Therefore,

Conclusion 9: Hypothesis 10 was not supported by the data.

Leaving a discussion of the individual hypotheses and attempting to synthesize the trends represented by the hypotheses, it may be seen that:

Conclusion 10: For this sample of black and white college graduates, birth order did not predict "success" in later life. It was seen that success was better predicted by other success variables, for example, education predicted occupation and both education and occupation predicted income.

CHAPTER VI. SUMMARY AND CONCLUSIONS

Summary

This thesis has attempted:

1. To synthesize a theoretical framework which not only explained the past findings but which also allowed further predictions to be made.
2. To predict from that framework to post-college success and to test those predictions while at the same time replicating the previous studies.
3. To cull the significance of birth order differences when other possible differences due to other factors were taken into account.
4. To determine if birth order was a predictor of educational and post-educational "success" variables for black as well as white Americans.

The study sample consisted of 930 black and white respondents who had graduated from three metropolitan Eastern universities. Of the 604 blacks, 276 were from a predominantly Negro university while the other 328 were from two integrated universities. All of the 326 whites were from the two integrated universities. The integrated blacks had been matched to both an integrated white and an other black on year of graduation, father's occupation and cumulative grade point average. The data were obtained by personal interviews conducted by NORC.

Because using a matched sample can cause methodological problems which interfere with the analysis, a special investigation into the possible consequences of using this type of sample was made. It was determined that the four hazards to matched samples -- regression to the mean, selection, attrition and quality of matches -- did not seriously affect the analysis of birth order differences. However, it was determined that the utilization

of college graduates could cause the differences between birth positions to be diminished.

The predictions that were made were based on a social-psychological framework of child rearing practices and differential role patterns for the different birth orders. Ten empirical hypotheses were formulated. These hypotheses, at the theoretical level, were:

Hypothesis 1: There will be a greater proportion of first borns involved in and completing a given level of education the higher that level of education.

Hypothesis 2: First borns, relative to later borns from the same class, will strive to be involved in and complete more education the higher the social class of origin.

Hypothesis 3: First borns will have higher grade points than later borns.

Hypothesis 4: First borns will be less active in extra-curricular activities than later borns.

Hypothesis 5: First borns will be financed in school by their parents more often than later borns.

Hypothesis 6: Persons who are financed in school by their parents will be involved in education more than persons who are not financed by their parents.

Hypothesis 7: First borns will be in higher prestige occupations than later borns.

Hypothesis 8: First borns will have higher incomes than later borns.

Hypothesis 9: First borns from large families will have lower prestige occupations than later borns from large families while first borns from families of other sizes will have higher prestige

occupations than later borns from the same family size.

Hypothesis 10: The same differences between first and later borns will hold for the blacks as for the whites.

These hypotheses were tested in two ways. First, descriptive data consisting of means or of percent distributions for the birth positions on the dependent variables was looked at. Second, using regression analysis, it was determined if birth order added a significant amount to the explained sums of squares. It was found that only one hypothesis was supported and this hypothesis held only for the black respondents. The hypothesis for which support was found was:

Hypothesis 5: First borns will be financed in school by their parents more often than later borns.

Discussion

While the majority of researchers have been in the position of trying to explain why birth order is a significant variable, this researcher is in the position of trying to understand why it has not proved to be of importance. For unlike other studies, it was found:

1. There was no overrepresentation of first born blacks in the sample, and there was no overrepresentation of first born whites once family size was taken into account;

2. There seems to be no difference between the birth order on the "success" variables of years of education, occupational prestige and income and on the "success-related" variables of cumulative grade point average and extra-curricular activities. Furthermore, knowing the respondent's birth order does not significantly add to the explained sums of squares for

these variables.

3. First borns, black and white, are financed in college more often by their parents than other borns. However, parents are not the main source of support for any of the ordinal positions. Furthermore, knowing the birth order of the respondent adds to the explained sums of squares for the blacks, but not for the whites.

Since none of the predictions have been entirely supported by the data, it becomes imperative to understand what factors are operating. There are three possibilities. The first would throw into question the theoretical framework itself, saying that the lack of support for the hypotheses is due to the fact that the hypotheses themselves are wrong. The second explanation would question the past research, indicating that birth order as a predictor has been overrated in the literature. The last would criticize the study itself; the tests and the data used were inadequate to show anything about the hypotheses or past research. Of course, when a researcher is confronted with a situation such as this, he does not have to choose one factor over another. Possibly all three enter into the anticipated reasons for the lack of findings. In fact, it is felt that this is the case with this study.

The author will attempt to show that this study questions the importance of past findings. Further, it will be shown that this questioning is a function of both the kind of sample used and a function of the kinds of assumptions which have been made about birth order. Therefore, the author will discuss each of the above three findings separately in order to attempt to understand how the explanations apply.

Proportion of first borns

The first finding the author will attempt to explain is why there was no overrepresentation of first borns in the sample since this is by far the most consistent finding from the previous research. Recalling the analysis from the previous chapter, a slight overrepresentation of first borns among the whites was found. However, once family size was taken into account, the author found only as many first borns per family size as one would expect by chance; that is, about one-third of the respondents from the three child family were first born, about one-fourth of the whites from the four child family were first born, etc. The same pattern held for the blacks. If this is the case, then why did one originally see what seemed to be an overrepresentation among the whites but not among the blacks?

Blacks come from families with an average of one more child per family. The whites have an average of 1.9 brothers and sisters while the blacks have 2.9 siblings to contend with. Therefore, there are more middle born blacks than middle born whites. In the absence of selection by birth order, we would expect more middle born blacks in college. Conversely, since whites come from smaller families, one would expect more first and last borns in college. This is exactly what was seen before family size was taken into account. However, once considered, there was seen little difference between the proportions of the birth positions for each race.

Before it can be concluded that the past studies have been wrong, it is wise to consider the possibility that this sample is unusual, that it is not representative of the larger black and white college populations. In the methodology chapter, it was shown that this is not the case for the blacks since, for the most part, they are the population of blacks from the

schools. However, the whites came from families where the father had lower occupational prestige than for the population of whites from those schools. Furthermore, it was predicted that this might result in selection of fewer first borns and selection of more middle borns than one might find in a more representative sample. Not only would the families with lower occupational prestige put less emphasis on education, but they would also tend to have larger families. Both of these factors would tend to diminish the potential advantage of the first born.

Adams and Meidam (1968) found, as we did, no overrepresentation of first borns in college. In explaining their results as opposed to Schachter's (1963), they note that Schachter was unable to control for all demographic factors, including the socio-economic categories of the birth positions. The findings in this paper indicate that family background may have been causing a spurious relationship in Schachter's data.

Success of first borns

While family size and family background of the sample may account for why one did not find as large an overrepresentation of first borns as Schachter (1963) and others found in college populations, it does not explain why the first borns who were included in the sample did not differ from the other birth positions. In order to understand this phenomena, one should turn for a moment to the study by Blau and Duncan (1967), in which they did find differences, in order to see how their study differs from these.

In the estimation of the author, there is one difference of note between this study and Blau and Duncan's study: the sample that they used

allowed for a much wider variation in the levels of occupations, incomes, and educational attainment. What possible effect could this have on the differences between our findings and these?

It was noted in the methodology chapter that use of college graduates could possibly reduce the differences between the birth positions due to self-selection. That Blau and Duncan found differences using a sample where selection had not taken place indicates that the prognosis was correct. The next logical question is whether this indicates that the author was misguided to use a college graduate sample.

The answer to this lies in remembering that the majority of the research has been done on college populations. Up until this time, researchers have noticed a large proportion of first borns in college (and this finding is even questionable) but have not known exactly what significance to place on that finding. The process of self-selection indicates, that although there may be more first borns in college, those persons who are in college, regardless of birth position, do not differ in their post-college careers. In other words, the differences that might have existed have been more than compensated for by the process of getting into college and furthermore, by the educational process itself.

Finances of first borns

So far one has seen that birth order makes no difference in college or post-college success. Why then did study find that first borns are more often financed in college than later born blacks? More importantly, does this finding indicate that the economic and not the social-psychological orientation was the one on which the study should have placed significance?

As we indicated in Chapter 3, the economic hypothesis was originally posited as a means of explaining the overrepresentation of first borns in college. We have no such overrepresentation. In addition, one would expect at least a majority of those first borns to be dependent on their parents for support. This condition was not met in the study, either. However, the data does indicate that first borns of both races have a slightly better chance of receiving financial aid from their parents than later borns. This may indicate that first borns do, in fact, have first, and therefore prime access to family financial resources. What has been assumed previously has been that this access would hinder the later borns in financing their education. This does not seem to be the case.

Possibly two factors are operating to produce this lack of hindrance: the personality of the first born and the history of financial aid. [In Chapter 3 one found reason to believe that the first born is more dependent on his parents than the later born. Conversely, the later born is more independent than the first born. Therefore, the first born may find it more "natural" to accept financial aid from his parents while the middle born would find it easier than the first to seek out and utilize alternate means of resources.]

This brings the reader to the second factor. Since World War II the emphasis placed on college education has increased. Along with this increased emphasis has come an increased access to college in the form of GI bills, scholarship aid, and loans. The average age of the respondents is 40. This means that a good proportion of the sample probably attended college after World War II, and were therefore eligible to take advantage of these alternate means of financing their education. This historical change,

along with the dependency of first borns on their parents, provides an explanation for our findings. In addition, it indicates that the economic hypothesis may be unacceptable as an explanation for the excess of first borns in college due to the fact that parents no longer have to be the prime source of support for college.

Childhood of first borns

There is one additional point that has been touched on but not answered. That is, since the hypotheses have not been supported, should the social-psychological orientation be considered invalid? The author feels that the lack of support does not indicate that the theoretical framework is wrong but that due to the self-selection mentioned previously, it has not been adequately tested. As the first born respondent gets older, other factors, in this case the educational process, can diminish the differences produced by childhood experiences. As was mentioned earlier, Blau and Duncan did find differences. Furthermore, they attributed these differences to the superior educational attainment of the first born. In this sample one has seen that the selection of later borns into college has closed the gap between the first and later borns in college and that this educational attainment is much more important in determining post-college success than early childhood practices. That these practices possibly showed up in Blau and Duncan's study is simply that the differential child rearing practices seem to affect education which in turn affects success. Now that the findings have been discussed, the paper will turn briefly to a discussion of what conclusions can be drawn from the study.

Conclusions

This paper has attempted to derive and test hypotheses about the college and post-college success of first borns based on a theoretical framework founded in differential childrearing practices for the different birth positions. It was found, contrary to what was predicted, that the first borns did not differ from later borns in any way except means of financing their education. Furthermore, one saw how the selection process of getting into college and graduating from college could reduce differences between the birth positions. In addition, one saw how family size and father's occupational prestige could affect the proportion of first borns attending college. Therefore, one may conclude concerning birth order and success in college and post-college careers:

- 1) The overrepresentation of first borns in college which has been noted in the literature may be due to demographic factors, resulting in a spurious relationship between birth order and college attendance;
- 2) Even if there are more first borns attending college, the selection process which takes place throughout the different educational hurdles tends to eliminate the differences between the birth positions which may have arisen originally due to different child rearing experiences;
- 3) First borns may have prime access to family financial resources. However, the economic hypothesis has failed to take into account the lessening dependence of children on their parents for economic support in college because of the recent increase in alternate means of financing.

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